
EXPANSION & RENOVATE AS NEW – PHASE 1

**CRYSTAL LAKE ELEMENTARY SCHOOL
284 SANDY BEACH ROAD
ELLINGTON, CT 06029
STATE PROJECT NO. 048-0058 EA/RR/PS**

S/P+A PROJECT NO. 12.140

DATE: January 6, 2014

The following changes to the Drawings and Project Specifications shall become a part of the Drawings and Project Specifications; superseding previously issued Drawings and Project Specifications to the extent modified by Addendum No. 5.

General Information/Clarifications:

- See attached RFIs. (19)
- See attached Substitution Requests. (14)

Changes to the Addenda:

- ADDENDUM #1, Changes to Specifications, SECTION 083313, COILING COUNTER DOORS:
 - Page 2:
 - Article 2.2.A.1.a., revise “**Series 650**” to read “**Series 651**”.
 - Article 2.2.C., revise “Galvanized” to read “Stainless”.
 - Article 2.2.E., revise “hot-dip galvanized” to read “stainless”.
 - Article 2.2.F., revise “Galvanized” to read “Stainless”.
 - Page 3:
 - Article 2.2.L.1., revise to read as follows:
“Stainless-Steel Finish: No. 4 (polished directional satin).”
 - Article 2.3.A.1., revise to read as follows:
“Stainless-Steel Door Curtain Slats: ASTM A 666, Type 304; sheet thickness of 22 gauge; and as required.”
 - Article 2.4.A.1., revise to read as follows:
“Stainless Steel: 22 gauge-thick stainless-steel sheet, Type 304, complying with ASTM A 666.”

- Page 4, Article 2.10, revise to read as follows:

“STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.”

- ADDENDUM #4:

- Page 1, Date, revise “2013” to read “2014”.
- New Specifications, SECTION 123553.19, WOOD LABORATORY CASEWORK, Page 5, Article 2.4.B., add the following:

“5. CIFLab Solutions LP”

New Specifications:

- SECTION 113100, RESIDENTIAL APPLIANCES has been added and is attached as part of this addendum. (4)

Changes to the Specifications:

- TABLE OF CONTENTS, Page 4, Division 11 – Equipment, add the following:

“Section 113100 Residential Appliances 4”

- SECTION 015713, TEMPORARY EROSION AND SEDIMENTATION CONTROLS has been deleted in its entirety. A new SECTION 015713, TEMPORARY EROSION AND SEDIMENTATION CONTROLS has been added and is attached as part of this addendum. (12)
- SECTION 051200, STRUCTURAL STEEL, Page 2, Article 1.4.C., delete in its entirety.
- SECTION 055813, COLUMN COVERS:

- Page 2:

- Article 2.1.C.1.a., revise “Mill, brushed” to read “High-performance organic coating”.
- Article 2.1.C.2., delete in its entirety.
- Article 2.1.C.6., revise to read as follows:

“Fabricate column covers with ¾-inch-wide reveals at horizontal joints produced by forming returns on mating ends of column cover sections. Locate horizontal joints as indicated.”

- Page 3:

- Article 2.5.A., revise to read as follows:

“Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.”

- Article 2.5.B., delete in its entirety.
 - Part 2, add the following:

“2.6 ALUMINUM FINISHES

- A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than seventy percent (70%) PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

- 1. Color and Gloss: As selected by Architect and Owner from manufacturer's full range.”

- SECTION 062023, INTERIOR FINISH CARPENTRY:

- Page 1, Article 1.2.A.2., delete in its entirety.
 - Page 2, Article 2.1.A.2., delete in its entirety.
 - Page 3, Article 2.1.B.2., delete in its entirety.
 - Page 5, Article 2.7.A.2., delete in its entirety.
 - Page 6, Article 3.4, delete in its entirety.

- SECTION 064113, WOOD-VENEER-FACED ARCHITECTURAL CABINETS, Page 2, Article 1.6.A., delete last sentence in its entirety.

- SECTION 064116, PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS, Page 2, Article 1.6.A., delete last sentence in its entirety.

- SECTION 072100, THERMAL INSULATION, Page 3, Article 2.2, add the following:

“G. Reinforced-Foil Faced, Glass-Fiber Blanket: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim Kraft, or foil-scrim polyethylene.”

- SECTION 084413, GLAZED ALUMINUM CURTAIN WALLS, Page 3:

- Article 1.9.A., revise to read as follows:

"Total Curtain Wall Installation

- 1. The responsible contractor shall assume full responsibility and warrant for one (1) year the satisfactory performance of the total curtain wall installation. This includes the glass

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- (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water, and structural adequacy and the specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at their expense during the warranty period.”
- Article 1.9, add the following:

“C. Window Material and Workmanship

 1. Provide written guarantee against defects in material and workmanship for ten (10) years from the date of final shipment.”
- SECTION 087100, DOOR HARDWARE:
 - Page 7, Article 2.4.B., add the following:

“3. Deadbolts: Minimum 1-inch bolt throw.”
 - Page 16, Article 3.6:
 - HW-3, add to the end the following:

“1 DEADBOLT”
 - HW-4, revise “A11A” to read “A111A”.
 - HW-5, Doors, add “C147A”.
 - Page 17, Article 3.6, HW-12, revise “B106A” to read “B106B”.
 - Page 18, Article 3.6, HW-17, delete “(CLASSROOM)” in its entirety, revise “B00A” to read “B100A” and add the following:

“3 PULLS”
 - Page 19, Article 3.6, HW-22, delete “(CLASSROOM)” in its entirety and add the following:

“3 PULLS”
 - Page 20, Article 3.6:
 - Doors B117A and B120A, delete from HW-33 and add to HW-12.
 - HW-32, revise “C131B” to read “C146A”.
 - SECTION 092900, GYPSUM BOARD, Page 7, Articles 3.5.D.1. and .3., delete in their entirety.
 - SECTION 096543, LINOLEUM FLOORING, Page 4, Article 3.2.C., add to the end the following:

“Expect and include in the Base Bid the requirement to apply and machine level at least three (3) coats of leveler in all spaces.”

- SECTION 096623, RESINOUS MATRIX TERRAZZO FLOORING has been deleted in its entirety. A new SECTION 096623, RESINOUS MATRIX TERRAZZO FLOORING has been added and is attached as part of this addendum. (6)
- SECTION 099123, INTERIOR PAINTING:
 - Page 1, Article 1.3, add the following:

“D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.”
 - Page 8:
 - Article 3.6.E.b. and .e., delete in its entirety.
 - Article 3.6.E.d., revise to read as follows:

“Topcoat: Latex, interior (Gloss Level 4), **MPI #43.**”
- SECTION 099113, EXTERIOR PAINTING:
 - Page 1:
 - Article 1.2.A.1., add to the end “and iron”.
 - Article 1.2.A., add the following:

“3. Plastic.”
 - Article 1.3.B., delete in its entirety.
 - Page 3, Articles 2.3 and 2.4, delete in their entirety.
 - Page 4, Article 3.2, add the following:

“E. Steel and Iron Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

F. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.”
 - Page 6, Article 3.6, add the following:

“B. Steel and Iron Substrates:

 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: Primer, rust inhibitive, water based, **MPI #107.**
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), **MPI #163.**

C. Plastic Trim Fabrication Substrates:

1. Latex System:

- a. Prime Coat: Primer, bonding, water based, **MPI #17**.
- b. Intermediate Coat: Latex, exterior, matching topcoat.
- c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), **MPI #11**."

- SECTION 101453, TRAFFIC SIGNAGE has been deleted in its entirety. A new SECTION 101453, TRAFFIC SIGNAGE has been added and is attached as part of this addendum. (7)

- SECTION 102800, TOILET, BATH AND LAUNDRY ACCESSORIES:

- Page 1, Article 1.2.A., add the following:

"5. Custodial accessories."

- Page 3, Article 2.2.D.1., add to the end "**#B-6806.99x48**".
 - Page 4, Article 2.2, add the following:

"G. Sanitary-Napkin Disposal Unit:

1. Basis-of-Design Product: **Bobrick #B-270**.
2. Mounting: Surface mounted.
3. Door or Cover: Self-closing, disposal-opening cover.
4. Receptacle: Removable.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Locations: Female gang restrooms only."

- Page 5, Part 2, add the following:

"2.7 CUSTODIAL ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation
5. Substitutions: Under provisions of Section 012500 "Substitution Procedures".

B. Mop and Broom Holder:

1. Basis-of-Design Product: **Bobrick #B-224**.
2. Description: Unit with shelf, hooks and holders.
3. Length: 36 inches.

4. Hooks: Three (3).
4. Mop/Broom Holders: Four (4), spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

a. Shelf: Not less than 18 gauge thick stainless steel.”

- SECTION 104416, FIRE EXTINGUISHERS, Page 2:

- Article 2.1.A.1.a., add to the end “and **Saturn 25**”.
- Article 2.1.A.1.b., add to the end “and **WC2½**”.
- Article 2.1, add the following:

“C. Wet-Chemical Type: UL-rated 2-A:1-B:C:K, 2.5-gallon nominal capacity, with potassium acetate and citrate-based chemical in stainless-steel container; with pressure-indicating gage.”

- SECTION 116623, GYMNASIUM EQUIPMENT, Page 6, Article 2.3.D.3., revise to read as follows:

“Size: As indicated on Drawings.”

- SECTION 274100, AUDIO VIDEO SYSTEMS, Page 1, Articles 1.3.B. and .D., delete in their entirety.
- SECTION 312319, DEWATERING has been deleted in its entirety. A new SECTION 312319, DEWATERING has been added and is attached as part of this addendum. (4)
- SECTION 314143, SHEETING AND STAYBRACING has been deleted in its entirety. A new SECTION 314143, SHEETING AND STAYBRACING has been added and is attached as part of this addendum. (4)
- SECTION 321216, BITUMINOUS CONCRETE PAVEMENT has been deleted in its entirety. A new SECTION 321216, BITUMINOUS CONCRETE PAVEMENT has been added and is attached as part of this addendum. (15)
- SECTION 321623, CURBING has been deleted in its entirety. A new SECTION 321623, CURBING has been added and is attached as part of this addendum. (8)
- SECTION 334000, STORM DRAINAGE SYSTEM has been deleted in its entirety. A new SECTION 334000, STORM DRAINAGE SYSTEM has been added and is attached as part of this addendum. (17)

New Drawings:

- DRAWING SKA4, ROOF DETAIL has been added and is attached as part of this addendum. This sketch revises information on Detail 1/A401.
- DRAWING SKA5, ROOF/WALL DETAIL AREA ‘A’ has been added and is attached as part of this addendum. This sketch revises information on Detail E/A553.~

Changes to the Drawings:

- DRAWINGS A001.1 AND A001.2, GENERAL INFORMATION, Drawing List, Abatement Drawings, HAZ004, delete in its entirety.
- DRAWING A101, FIRST FLOOR PLAN AREA 'A', First Floor Plan – Area 'A' 1, Science Storage A125, revise section tag "C/A503" to read "D/A503".
- DRAWING A104, BASEMENT & TUNNEL PLAN, Construction Notes, Basement Plan, add symbol to west wall of Pump Room A002 and add the following:

“10. Infill foundation wall to match existing adjacent concrete at location of underground tank and pipe removals as part of Addendum #4. See plumbing and civil drawings (sketches) for removal scope.”
- DRAWING A131, ROOF PLAN AREA 'A', Roof Plan – Area 'A' 1:
 - Add detail tag "C/A553" to the south edge of Roof "A4" and tag "D/A553" to the north edge of Roof "A4".
 - Add detail tag "E/A553" (SKA5) to the east edge of Roofs "A5.1", "A5.2", "A5.3" and the south jog of Roof "A6".
- DRAWING A132, ROOF PLAN AREA 'B', Roof Plan – Area 'B' 1:
 - Add detail tag "C/A552" to the north edge of Roofs "B2" and "B3".
 - Roof 'B3', west edge, add detail tag "J/A551" facing North and revise east edge tag "3/A401" to read "J/A551 opp. hd.".
- DRAWING A302, EXTERIOR ELEVATIONS, Column Cover Horizontal Joint Detail A and Column Cover Vertical Joint Detail B, revise "brushed finish" to read "organic finish" at all instances.
- DRAWING A401, BUILDING SECTIONS, Building Section – Classrooms A:
 - Detail tag "1/A509" adjacent to Column Line U, revise to read "SK4".
 - Detail tag "1/A509" adjacent to Column Line D, revise to read "SK4 opp. hd. sim.".
- DRAWING A403, BUILDING SECTIONS:
 - Building Section A, revise tag "1/A503" to read "J/A551 Opp", tag "1/A508" to read "A/A508", tag "2/A508" to read "B/A508" and tag "2/A503" to read "Q/A640".
 - Building Section B, revise tag "1/A507" to read "A/A507" and tag "2/A507" to read "B/A507".
- DRAWING A510, WALL SECTIONS, Wall Section Area 'C' C, add note "Liquid applied vapor barrier" to the left side of the section above the note "cavity flashing" pointing to the cavity side of the 8 inch cmu.
- DRAWING A553, SECTION DETAILS, Detail @ Wall/Roof Area "A" C and D, revise "¼" FRP interior wall finish" to read "1/8" FRP interior wall finish".

- DRAWING A600, ENLARGED PLANS & ELEVATIONS:
 - Enlarged Toilet Room (Area 'A') 9, add Construction Note '3' symbol to rectangular box on North wall.
 - Construction Notes, add the following:

“3. Motorized special needs changing table, 55½” long x 31” wide, wall mounted, foldable; Model Pressalit Care 3000 manufactured by Max-Ability or approved equal.”
- DRAWING A622, WINDOW ELEVATIONS, Window Elevations 1, Types CW C8, C9 and C9.1, revise detail tag “W/A630” to read “C/A510”.
- DRAWING A700, TOILET ROOM FIXTURE ELEVATIONS:
 - Toilet Accessory Legend, add the following:

“15. Custodial shelf.”
 - Janitor’s Closet 13, 14, 18 and 19, add toilet accessory symbol “15” at the shelf.
- DRAWING A726, CASEWORK ELEVATIONS, Cafeteria – East 5, coiling door note, add to the end the following:

“4’-9” wide by 3’-5½” high stainless steel with 4-sided, nominal 2” x 8”, 16 gage stainless steel frame”.
- DRAWING A728, INTERIOR ELEVATIONS, All, Scale, revise “½” = 1’-0”” to read “¼” = 1’-0””.
- DRAWING A729, INTERIOR ELEVATIONS, All, Scale, revise “½” = 1’-0”” to read “¼” = 1’-0””.
- DRAWING A910, DOOR SCHEDULE AREA ‘A’ & ‘B’:
 - Door Schedule – First Floor Area ‘B’, Doors B132A and B132B, delete symbol for “push plate/pull handle” in its entirety.
 - Schedule Remarks, Note 12, delete in its entirety.
- DRAWING A911, DOOR SCHEDULE AREA ‘C’:
 - Door Schedule – First Floor Area ‘C’, Door C121A, delete symbol for “push plate/pull handle” in its entirety.
 - Schedule Remarks, Note 12, delete in its entirety.
- DRAWING HAZ003, ROOF HAZARDOUS MATERIAL ABATEMENT, General Notes, revise to read as follows:

“Asbestos – Refer to Section 028200

1. WORK AREA 9 – ROOF

REMOVE ACM IN THE FORM OF:

- PENETRATION FLASHING

FOLLOWING OSHA REGULATIONS.

2. WORK AREA 10 – ROOF

REMOVE ACM IN THE FORM OF:

- PARAPET FLASHING
- TRANSITE SHINGLES
- PERIMETER FLASHING

FOLLOWING OSHA REGULATIONS.

3. WORK AREA 11 – ROOF

REMOVE ACM IN THE FORM OF:

- BUILT-UP ROOFING
- PERIMETER FLASHING

FOLLOWING OSHA REGULATIONS”

- DRAWING S600, GENERAL NOTES, Slab On Grade, Note 1, revise to read as follows:

“All slabs on grade shall bear on 4 inches of processed stone or 3/8 inch crushed stone directly below the vapor barrier and a minimum of 12 inches of controlled fill below. All joints of the vapor retarder shall be sealed with tape.”

- DRAWING M402, BOILER/HYDRONIC SCHEDULES, Finned Tube Radiation Schedule, FT-2, Rows of Elements, revise “1” to read “2”.

The bid dates are unchanged by this addendum.

The addendum consists of one hundred twenty (120) pages of 8½” x 11” text, one (1) 8½” x 11” drawing and one (1) 11” x 17” drawings.

End of Addendum #5



RFI - Request for Information

Project: Crystal Lake Elementary School **Date:** 12-19-13

<p>To: Mr. Paul Jorgensen Silver/Petrucelli + Associates, Inc. 3190 Whitney Ave, Bldg 2 Hamden, CT 06518 pjorgensen@silverpetrucelli.com</p>	<p>From: Steven Bushnik R&R Window Contractors, Inc. One Arthur Street Easthampton, MA 01027 413-527-7500 x156 413-527-6380 FAX sbushnik@rrwindow.com</p>
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Bid Package:

Description:

10. W/A630 is shown as a reference detail for some window frames (i.e. C8, C9, C9.1). This detail is not on A630. Please provide this detail. A630 does not show head or sill details.
11. C16 shows E & G/A630 as a reference sill detail. E&G/A630 are shown as a jamb/vertical details. Please provide proper sill detail for these frames.
12. Section 084413 states assembly warranty is to be by manufacturer for 10 years. Specified manufacturers will not cover this warranty as stated. Item 1.9.A.a & b will be covered by the installers PE insurances. Item 1.9.A.c will be covered by the manufacturer for a 3 year standard term and an up charge for 10 years. Item 1.9.A.d is covered as an installer's warranty – which can only be covered to a maximum of 3 years per bonding limits for most installers. Item 1.9.A.e is a window warranty for the concealed vents and can be carried for 10 years from the manufacturer. Please verify this is acceptable for this project. This issue will be common among most glazing contractors bidding this project.

Responses:

10. Head & sill are shown on section C/A510 for window types C8, C9 & C9.1
 11. There are two (2) locations for type C16, in Vest. C100 and Lobby C101 as shown on drawing A105. The east facing location in Lobby C101 shall become C16.1 as its details are slightly different from the west facing location in Vest. C100. The section through C16.1 is shown on B/A506 with details referenced to drawing A556. The section through C16 is the upper portion of C/A506 with details referenced again to drawing A556.
 12. Warranty information shall be revised as part of Addendum #5.
- P. Jorgensen/R. Bouchard 01.06.14



Request for Information

Job Name: Crystal Lake Elementary School KBE Project #:13-160

Job Address:284 Sandy Beach Road, Ellington, CT 06029

RFI# 13

Date Created: 1/6/14

Submitted To:	Submitted By:
Paul Jorgensen	Ray Suite
Silver/Petrucelli + Associates, Inc.	KBE Building Corporation
3190 Whitney Avenue, Building 2	30 Batterson Park Road
Hamden, CT 06518	Farmington, CT 06032
Phone: 203-230-9007 X208	Phone: 860-284-7630
Email: pjorgensen@silverpetrucelli.com	Email: 860-284-0121

Subject:	Discipline:	Co-Author:
Intumescent Painting		

Submittal #:	Drawing #:	Addendum:	Spec Section:	Schedule #:

Distribution:

Information Requested:	Date Required:
Is there any requirements for intumescent painting?	

Answer Received:	Date Received:
<p>Response: Intumescent painting is required for column N2 and associated beam connections.</p>	



Request for Information

Job Name: Crystal Lake Elementary School KBE Project #:13-160

Job Address:284 Sandy Beach Road, Ellington, CT 06029

RFI# 10

Date Created: 12/27/13

Submitted To:	Submitted By:
Paul Jorgensen	Ray Suite
Silver/Petrucelli + Associates, Inc.	KBE Building Corporation
3190 Whitney Avenue, Building 2	30 Batterson Park Road
Hamden, CT 06518	Farmington, CT 06032
Phone: 203-230-9007 X208	Phone: 860-284-7630
Email: pjorgensen@silverpetrucelli.com	Email: 860-284-0121

Subject:	Discipline:	Co-Author:
Door Hardware		

Submittal #:	Drawing #:	Addendum:	Spec Section:	Schedule #:

Distribution:

Information Requested:	Date Required:

Answer Received:	Date Received:
<ol style="list-style-type: none"> 1. In the hardware schedule B100A calls for exit device (classroom) and NO push/pull hardware but in the door schedule in the plans it calls for push/pull hardware, not lever trim. This is the case with, B132A, B132B, C100A, C121A. Please clarify how the opening to operate? Is there to be a keyed cylinder on the outside, or just the pull to be operated once the device is dogged down from the inside? Please clarify. Doors B100A and C100A are revised to match Drawings in Addendum #5. Doors B132A, B132B and C121A are as indicated in Section 087100. 2. B117A in the specs calls for a passage lockset, but on the door schedule calls for a panic device, push/pulls, and lever handle. What is the correct hardware set for this opening? The correct hardware set for B117A is HW-12 and will be edited in Addendum #5. R. Bouchard 01.06.14 	



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ARMANI
RESTORATION INC.

Masonry Restoration ▲ Concrete Restoration ▲ Waterproofing ▲ Air & Vapor Barrier ▲ Joint Sealant

December 31, 2013

Crystal Lake Elementary School; Ellington, CT
Armani Request for Information #1

To: Paul Jorgensen
Silver Petrucelli & Associates
3190 Whitney Avenue
Hamden, CT 06518-2340
Email: pjorgensen@silverpetrucelli.com

From: Tony DeNapoli
Email: estimating@armanirestoration.com

QUESTION:

- 1.) There do not appear to be any references to the Self-Adhering Sheet Waterproofing on the plans and there is no information regarding the location of this waterproofing in the specifications. The only location we can see where this type of waterproofing would be on the exterior side of the wall and footing in Detail 5/S300 where there are two slabs at different levels. *Please confirm that this is where the waterproofing is to be installed and/or provide additional information on where it needs to be.*
- 2.) Specification Section 071900, Under Slab Vapor Barriers specifies two products, Grace Florprufe 120 and Stego Wrap. *Given that these two products are fairly different and the Grace does cost more please clarify if there is a preference for one or the other.*

ANSWER:

1. This is the air/vapor barrier that is on stud back-up with masonry veneer such as shown on Wall Section C/A510.
2. There is no preference. The product must meet the standards specified.

R. Bouchard 01.06.14



December 20, 2013

Silver/Petrucci Architects
 3190 Whitney Ave
 Hamden, CT 06518
 Via email pjorgensen@silverpetrucci.com

Re: Crystal Lake Elementary School
 Ellington, CT
 RFI #1

Dear Paul:

Our initial review of the bid documents has raised the following questions. Your time and effort to review and clarify these questions via an addendum would be greatly appreciated.

DIVISION 1 – GENERAL

1. Drawing A403: All 5 Detail tags are mislabeled. Please correct.

Response: For Building Section A/A403 the corrected roof eave tags are as follows from left to right: change 1/A503 to J/A551 Opp. Hd., change 1/A508 to A/A508, change 2/A508 to B/A508. Also change low roof tag 2/A503 to Q/A640. For Building Section B/A403 change tag 1/A507 to A/A507, and 2/A507 to B/A507.

2. Regarding the temporary fencing, please confirm which is correct:
 - a. 6' high per 13/C-600
 - b. 8' high per 015000, 2.1, A

Response: 8' high is correct.

3. Please confirm Owner is responsible for the Utility Company charges:
 - a. Electrical
 - b. Sanitary

Response: Utility company charges for street connections are the responsibility of the Owner. Permit fees are the responsibility of the contractor.

4. Elevations on A728 & A729 are noted with scale $\frac{1}{2}'' = 1'0''$. Please confirm the scale is $\frac{1}{4}'' = 1'0''$.

Response: Yes, drawings on A728 and A729 are $\frac{1}{4}'' = 1'-0''$.

5. Specs 015713, 101453, 312319, 314143, 321216, 321623 & 334000 are all titled Windermere School. Normally we assume this is a typo, but with a concurrent public bid, please clarify if these specs apply to Crystal Lake.

Response: It is assumed that you have the incorrect specifications. The correct Crystal Lake specifications will be reissued.

DIVISION 3 – CONCRETE

6. Spec's 096519 and 096536 paragraphs 3.2C: Please confirm this is the only leveling required for spec section 035413 work and installed at existing concrete floors only.



Response: Sections 096519 and 096536 were deleted as part of Addendum #4. Leveling work will be as required for Sections 096543, 096813 and 096816 installations.

7. The Levelrock Quik-Top is recommended to be placed in one coat up to 1" thick. Please confirm that one lift is acceptable. For this product, what is the thickness to use?

Response: The thickness of the product used is not relevant as the requirement is for up to three (3) coats to provide a level underlayment for the new flooring to be installed.

DIVISION 5 – METALS

8. Spec 051200 Para 1.4B: Please confirm the premium cost for an AISC STD certified fabricator is intended for this project, limiting the number of steel bidders to the few certified subcontractors.

Response: Certified fabricator is to remain.

9. Spec 051200 Para 1.4C: Please confirm the premium cost for an AISC CSE certified erector is intended for this project, limiting the number of steel erectors to the few certified subcontractors.

Response: Certified erector can be waived.

DIVISION 6 – WOOD & PLASTICS

10. Specs 064113 Para 1.6A & 064116 Para 1.6A: Please confirm the premium cost for an AWI QCP certified fabricator is intended for this project, limiting the number of millwork bidders to the few certified subcontractors.

Response: AWI QCP can be waived.

11. Spec 062023 Para 1.2A2: We do not find Interior board paneling in the part 2 of this spec. Please clarify intent and provide spec accordingly.

Response: Interior board paneling is not applicable.

12. Room A106 – please provide elevations and detail for the assumed millwork/shelving.

Response: A106 is existing millwork to remain.

13. Room B124 – please provide elevations and detail for the assumed millwork/shelving.

Response: B124 is existing millwork to remain.

14. Room A127 – what is the rectangle along the north wall of that room.

Response: Rectangle is representative of a motorized changing table, specified on Drawing A600 in Addendum #5.

DIVISION 7 – THERMAL & MOISTURE PROTECTION

15. Detail E/A554

- a. Please provide a spec for the vapor barrier covering the R38 insulation, spec 072100 calls for kraft or unfaced insulation only.

Response: All roof batt insulation to be provided with foil faced vapor barrier, which will be added to spec.

- b. Please confirm the insulation is installed with impaling pins, we find no spec for this.

Response: Confirmed.



- c. Please confirm the insulation is installed under the roof deck only between the steel beams and insulation is NOT installed under the steel beams too.
Response: The insulation shall be provided to form a continuous thermal envelope and hence wrap under the beams.
16. Details A, F, G/A550 & similar – please provide a spec for the vapor barrier covering the R38 insulation, spec 072100 calls for kraft or unfaced insulation only
Response: All roof batt insulation to be provided with foil faced vapor barrier, which will be added to spec.

DIVISION 8 – DOORS & WINDOWS

17. Spec 083473: Please provide door numbers from Door Schedule on Drawing A910 & A911 which doors are sound rated. Also, what is the STC rating of the doors?
Response: Doors B112A and B112B (for Music Room B112) are sound rated.
18. Drawing A910 & A911: Schedule Remarks Note #16 is not identified in the Door Schedule. Please provide list of doors intended to be sound doors.
Response: Note #16 applicable at both Music Room B112 doors as noted in question 17 above.
19. Please provide STC rating for the sound doors.
Response: Rating for doors is STC-30 or more. Rating for sound doors is STC-40 or more.
20. Drawing A910 & A911: Schedule Remarks Note #12, which openings does this apply to?
Response: Note #12 is not applicable.
21. Drawing A726 elevation 5: What is the size of the coiling door? Provide details?
Response: Add dimension to drawing 5/A726 of 4'-9" wide by 3'-5 1/2" high with notation stating stainless steel coiling door with 4 sided, nominal 2" x 8", 16 gage stainless steel frame.

DIVISION 9 – FINISHES

22. Details A/A559 & E/A559
- a. Please clarify what is supporting the 5/8" gypsum board.
Response: Provide continuous 1.5x1.5 perimeter angle to fasten gypsum board.
- b. Please confirm the concealed gypsum board is to be painted.
Response: For these details the concealed gypsum board does not require painting.
23. Spec 092400 – please clarify scope of the exterior plaster is only vestibule B111 only.
Response: Confirmed, outside of Vest. B111.
24. Spec 092400 – please clarify scope of the interior plaster.
Response: Interior plaster is not applicable, no locations.
25. Spec 092900 Para 2.3B – please clarify where abuse board gypsum board is intended. Drawing A900 does not mention abuse board.
Response: All interior gypsum board is abuse resistant.
26. Spec 092900 Para 3.5D3 – please confirm the intent is to provide all exposed gypsum board with level 5 finish, as the gloss is the only paint sheen in spec 099123 Para 3.6E.



Response: All exposed gypsum board is to receive Level 4 finish. Refer to Section 090000 and Addendum #5.

27. Spec 096623 para 1.7A.1: There is only one NTMA member to install this product we can find. Is the intent to rely on the one sub only? Can this NTMA membership requirement be waived?

Response: Requirement waived as part of revised specification section provided in Addendum.

28. Spec 096623 para 2.2B.1 & 2: Provide tile size, pattern, color, price group, finish and thicknesses.

Response: Specification revised as part of Addendum to a poured epoxy terrazzo floor. Estimate up to six (6) color options. Pattern to be determined during shop drawings.

29. Spec 096623 para 1.3A.1.c & 1.4.C.6: What pattern should the installer assume when pricing labor to install? Is full tile pattern acceptable?

Response: Specification revised as part of Addendum to a poured epoxy terrazzo floor. Pattern to be determined during shop drawings.

30. Spec 096623: Will only one color be chosen?

Response: Estimate up to six (6) color options. Colors must comply with Connecticut's High Performance Building standards in terms of use of low VOC materials and 10-20% recycled content.

31. Spec 099646: We cannot locate where the intumescent paint is required. Can you provide locations?

Response: Intumescent paint coating required on column N2 and immediate beam connections.

32. Please provide spec for the intended paint finish for the PVC trims.

Response: Information provided in Addendum #5.

DIVISION 10 – SPECIALTIES

33. Spec 102600 para 1.2A.1: We do not find any corner guards. Please provide locations.

Response: There are no corner guards in the project.

34. Drawing A920 note 4 and sign types S7, S9 & S10. Please confirm there are none of these or any others that are not in door schedules.

Response: Provide one (1) sign type S7 inside Gymnasium B113. Provide sign type S9 in Vest. B100 west wall and Vest. C100 south wall. Provide one (1) sign type S10 in Attic Boiler Room C201 by door C200A.

DIVISION 11 – EQUIPMENT

35. Spec for Residential Appliances is missing – Rooms A102, C104. Can you provide?

Response: Specification will be issued as part of Addendum #5.

36. Spec 116623 – will Porter or Spaulding be acceptable alternates for the gym equipment?

Response: We cannot make a determination of equal without a formal request for substitution and a side by side comparison which demonstrates conformance with requirements.



37. Para 2.3D3 specifies wall pads 3'x8'. Elevations on A728 scale 2'x5'. Please clarify wall pad size.

Response: Proceed with dimensions provided on elevations.

38. Elevations on A728: Please confirm wall pads are not required on the doors.

Response: Pads are not required on the doors.

39. Elevations 9 & 10/A723: Please confirm these wall pads are per Spec 116623.

Response: Spec section 116623 covers the walls pads shown on 9 & 10/A723.

40. Elevations 9 & 10/A723: Please clarify if wall pad counts are limited as shown or full perimeter as note states.

Response: Refer to Addendum #4, SKA3 for clarification on wall pad locations.

DIVISION 12 – FURNISHINGS

41. Spec 123553.15 Para 2.3B & 2.6C refer to an alternate for stainless steel counters. We do not find this on the bid form or spec 012300. Please clarify intent. If an alternate is intended, please provide detail and locations of intended stainless steel counters.

Response: Not applicable, specification section was revised and reissued in Addendum #4.

42. Spec 090000 Page 12 WD-1: Elevations on A720 note oak cabinets in Science room also, but we do not find a spec for oak cabinets. Please provide spec for the oak cabinets.

Response: Section 123553.19 was issued in Addendum #4.

DIVISION 13 – SPECIAL CONSTRUCTION

43. Regarding Spec 132700 – Vaults

a. It appears that the vault options in the specification section need to be chosen by the design team. Please provide options.

b. Please identify where the vault is located on the drawings.

Response: Not applicable, Section 132700 was deleted in Addendum #4.

DIVISION 15 – MECHANICAL

44. Drawing M302 – provide correct scale. 1/8" is stated.

Response: Drawing M302 was reissued in Addendum #4.

DIVISION 16 – ELECTRICAL

45. Please confirm the Owner will pay for fuel to fill the tank after the Electrical contractor has completed the site testing of the Generator.

Response: Correct. The Contractor is responsible for all fuel needed to perform testing of the generator. The Owner shall provide fuel once testing is complete.

Please contact me with any questions concerning the above.

Sincerely,
Richard Walsh
Estimator

Cc File



Request for Information

Job Name: Crystal Lake Elementary School KBE Project #:13-160

Job Address: 284 Sandy Beach Road, Ellington, CT 06029

RFI# 12

Date Created: 1/6/14

Submitted To:	Submitted By:
Paul Jorgensen	Ray Suite
Silver/Petrucelli + Associates, Inc.	KBE Building Corporation
3190 Whitney Avenue, Building 2	30 Batterson Park Road
Hamden, CT 06518	Farmington, CT 06032
Phone: 203-230-9007 X208	Phone: 860-284-7630
Email: pjorgensen@silverpetrucelli.com	Email: 860-284-0121

Subject:	Discipline:	Co-Author:
Sitework		

Submittal #:	Drawing #:	Addendum:	Spec Section:	Schedule #:

Distribution:

Information Requested:	Date Required:
<p>Drawing C-300 and C-602 show the limits of the Sports Turf at the South Soccer Field and Baseball Field. Drawing C-400 shows the Field Underdrain extending beyond the limits of the Sports Turf. Would detail 9/C-606 be extended to include the areas of underdrain that are outside the limits of the Sports Turf?</p> <p>Section 6.1 of the Geotech Report says there should be at least 16" of controlled fill below slabs, and the final 4" shall be 3/8" crushed stone or processed stone base. Drawing S600, Slab on grade Note #1 calls for 16" controlled fill AND 4" of processed base. Which is correct?</p>	

Answer Received:	Date Received:
<p>BSC Response to Part 1: Detail 9/C-606 applies to the entirety of the area within the baseball and soccer field limits, the flat area on the south portion of the fields between the field limits and the bottom of the slope, and the flat area on the northeast portion of the soccer field to the northernmost field underdrain.</p> <p>MHA Response to Part 2: The slab on grade note on drawing S600 should be revised to read "4 inches of processed stone or 3/8 inch crushed stone directly below the vapor barrier and a minimum of 12 inches of controlled fill below."</p> <p>January 6, 2014</p>	



December 27, 2013

Silver/Petrucelli + Associates
 3190 Whitney Ave
 Hamden, CT 06518
 Via email pjorgensen@silverpetrucelli.com

Re: Crystal Lake Elementary School
 Ellington, CT
 RFI #2

Dear Paul:

Further review of the bid documents has raised additional questions. To avoid confusion, we have continued our questions in numerical order from our original RFI #1 dated 12/20/13.

DIVISION 5 – METALS

46. Section 055813, 2.1. C. 1.a conflicts with C.2: what is the finish for the column covers?
 a. says "Finish: Mill, Brushed" and C.2 specify "... prefinished metal sheets in lieu of finishing after fabrication..." What is the finish for the column cover?

Response: Pre-Finished aluminum column cover shall have 2-coat floropolymer paint finish.

47. Section 055813, 2.1. C. 6 & 7 conflict with DWG see detail 3/A302; how many horizontal reveals are there? What is the dimension for the reveals: depth, width, set back? Are reveals closed or open? Further, the spec does not specify what is indicated on detail 3/A302, and will the enlarged detail take precedence over spec? Please clarify this contradiction.

Response: Column cover reveals are per Drawing A302, with closed reveals.

48. Drawing A102 Room B105: Is there a detail and elevation for the column cover shown about 8' from the new interior masonry wall?

Response: Column cover in Cafeteria B105 is to match (material, profile, finish, etc.) exterior column cover detailed on Drawing A302.

49. Drawings A910 & A911: The following doors are missing HW sets and are not in 087100, para 3.6: A111A, B100A, B106B, C146A, C147A.

Response: Doors have been indicated and added per Addenda #4 and #5.

50. Spec 087100, para 3.6 – Door Hardware Schedule conflicts.

- a.) HW-4: There is an opening A11A that is not on A910 schedule.
- b.) HW-17: Opening B00A is not on A910 on schedule
- c.) HW-12 & HW-15 has Door Opening B106A for both. Which is correct?
- d.) HW-32: There is no such C131B on A911 schedule.

Response: Door A11A is A111A; Door B00A is B100A; HW-15 is correct; C131B does not exist.

51. Spec 087100 para 2.14A: Where are these located? Cannot find them.

Response: Power Assist Operator is located on Door B132B.



52. Drawings A102/A103: Rooms B133 & C103 are missing hollow metal frame types for the borrowed lites. Please identify types.

Response: See RFI #17 response.

DIVISION 9 – FINISHES

53. Spec 096400 – what is scope for this wood floor spec? The symbol is WDF1 which we do not find on the drawings. Please clarify scope.

Response: WDF1 is no longer applicable, Section 096400 deleted in Addendum #4.

54. Drawings A230, 231, 232 – Symbol Legend “existing wood (refinished)”- none found. Is there any in project?

Response: WDF1 is no longer applicable.

55. Spec 097200: We do not see any wall covering types on the Finish Schedule noted as WC1, WC2 and WC3. Please specify rooms.

Response: Not applicable, Section 097200 deleted in Addendum #4.

56. Spec 095113, 2.7D: We do not find symbol TR1 in the documents. Can you provide locations?

Response: TR1 is not applicable, disregard all references.

DIVISION 10 – SPECIALTIES

57. Drawing A700 Toilet Accessory Legend: Please confirm item #9 is a tilt mirror as per spec 102800 para 2.2F since this is the only type specified.

Response: Confirmed.

58. Drawing A700 Details 14,18: Provide spec for the shelf.

Response: Provide Bobrick B-224 x 36 Shelf with mop and broom holders and rag hooks. Add number item #15 to toilet accessory legend and tag shelving in elevation.

59. Drawing A600 Detail 6: Please provide toilet accessories required for rooms A108 & A111.

Response: In Room 108 provide toilet accessories #7, 8, 9, 11 & 14. In Room A111 provide #7, 8, 9, 11, 12 and 14.

60. Drawing A101 Room A126: There is a partial board type symbol adjacent to WB #2 on the North Wall. Please clarify this board type.

Response: Tack board type TB#2.

61. Spec 104413: Provide spec for the fire blanket cabinet and blanket for Room A124.

Response: Section 123553.19 was issued in Addendum #4.

62. Kitchen fire extinguisher – Confirm that a Type K is required for the kitchen.

Response: Confirmed.

DIVISION 11 – EQUIPMENT

63. Drawing A102 Room B113: The bleacher manufacturer recommends a minimum 4” side operating clearance (6” would be ideal) at end of the bleachers. Is it possible to enlarge the 36’ dimension?

Response: Dimensions to remain unchanged. Note: the team will work with contractor regarding clearances during construction as needed.



Please contact me with any questions concerning the above.

Sincerely,
Joseph Petronella
Estimator

Cc File

From: Rebecca Bouchard
Sent: Monday, January 06, 2014 11:15 PM
To: 'justint@valleycommunications.com'
Subject: RE: 12.140 Crystal Lake ES Expansion & Renovate As New - Addendum #4

Justin, please see the responses your questions in 'red' below.
Thank you.

Rebecca Bouchard, CSI, CDT
Intern Architect

www.silverpetrucelli.com

SILVER / PETRUCELLI + ASSOCIATES
Architects/Engineers/Interior Designers

3190 Whitney Avenue Bldg 2
Hamden, Connecticut 06518
P: 203-230-9007 ext. 202
F: 203-230-8247
S/P+A is a member of the U.S. Green Building Council

From: Justin Trudeau [<mailto:justint@valleycommunications.com>]
Sent: Monday, January 06, 2014 8:32 AM
To: Rebecca Bouchard
Subject: Re: 12.140 Crystal Lake ES Expansion & Renovate As New - Addendum #4

Rebecca,
I don't want to be a bother, but the RFI we sent over regarding the AV for Crystal lake on December 21st, is there any chance they will be answered soon? Answers to those questions hold a lot of sway over the equipment and complete systems for our estimate. I've included them again below just in case. If we hear back by tomorrow morning we'll have to make assumptions and allowances in our estimates to ECs.

Section 274100

- 1.3 D - Is there a list of "Existing SMART Boards"?
No - all smartboards are new as specified.
 - In locations where there is an "A" type faceplate, there is no faceplate shown at the projector location. Should there be a faceplate? What should that plate be?
 - Room - A100, B102, B105, A124, C141, C143, C136, C135 **no additional faceplate as these are required for passive systems.**

- Room C120 shows only an "A2" plate. Should there also be an "A3" plate? **Yes, an A3 plate should be located near the smartboard. See T304 detail 1 for location.**
- A "2DU" plate has been called for in drawings but no detail or part numbers have been provided. **Disregard the "2DU" plate. It is not required.**
- Detail drawings show stereo mini audio out from the computer going to both the faceplate going to projector as well as directly into the Lightspeed sound system. Which one is correct? **3.5 audio from computer shall connect to lightspeed media connector as shown on T304 details 3&4. The 3.5 audio connections on the A2 & A3 are not to be utilized. Only the VGA connections will be utilized.**

--

Justin L. Trudeau
 Bid Coordinator / Technical Analyst
 1-800-522-4136 ext 158
 C: 413-313-7036
 Valley Communications Systems, Inc.
 20 1st Ave.
 Chicopee, MA 01020
New England's Single Source for Technology:
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MA License #: 1350-C
CT License #: CT-C5-192407
RI License #: RI-TSC-464

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From: Rebecca Bouchard
Sent: Tuesday, January 07, 2014 12:40 AM
To: 'abarszcz@rizzocorporation.com'
Cc: Paul Jorgensen
Subject: RE: crystal lake elementary school - rfi 2

HAZ004 does not exist and will be removed from the drawing list. Thank you.

Rebecca Bouchard, CSI, CDT
Intern Architect

www.silverpetrucelli.com

SILVER / **PETRUCELLI + ASSOCIATES**
Architects/Engineers/Interior Designers

3190 Whitney Avenue Bldg 2
Hamden, Connecticut 06518
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F: 203-230-8247
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From: Andrew Barszcz [<mailto:abarszcz@rizzocorporation.com>]
Sent: Thursday, January 02, 2014 8:23 AM
To: Joan Ireland
Subject: crystal lake elementary school - rfi 2

1. Drawing list sheet (a001.1) shows HAZ004 Roof Hazardous Material Abatement. I do not think this sheet a part of the bid drawing set. Please advise.

Andrew Barszcz
Estimator
Rizzo Corporation
64 Triangle Street
Danbury, CT 06810
203-731-3132, ext 1808
203-748-8747-fax
<http://www.rizzocorporation.com>
AA/EOE Employer

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License #00900574 • www.wjmountford.com**RFI -TRANSMITTAL**

Attention: Paul Jorgensen **Company:** Silver/Petrucelli & Associates
Email: pjorgensen@silverpetrucelli.com **Fax:** 203-230-8247
Reference: **RFI # 04**
Crystal Lake Elem School

Question:

1) Spec 132700 Vaults does not seem to be complete. What room is the Vault scheduled to be in?

Thanks.

Architect's Response

Section 132700 is not applicable and has been deleted from the project.
R. Bouchard 01.06.14

From: Mike Garneau
Estimator

Date: 12/30 /13

Copy:

Rebecca Bouchard

From: Rebecca Bouchard
Sent: Tuesday, January 07, 2014 12:48 AM
To: abarszcz@rizzocorporation.com
Cc: Paul Jorgensen
Subject: RE: crystal lake elementary school - rfi 4

Andrew please see RFI #33 of Addendum #4 for response your RFI.
Thank you and have a great day.

Rebecca Bouchard, CSI, CDT
Intern Architect

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F: 203-230-8247

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From: Andrew Barszcz [<mailto:abarszcz@rizzocorporation.com>]
Sent: Thursday, January 02, 2014 1:56 PM
To: Joan Ireland
Subject: crystal lake elementary school - rfi 4

Acoustical ceilings

- Specs section 095113 – Acoustical Panel Ceilings calls for act 1, act 3, act 4
- Drawing a930 – finish schedule – calls for act 3, act 4, act 5
- Specs section 090000 – Schedule of finishes calls for act 1, act 2, act 3, act 4, act 5

Product specifications do NOT match. Please advise.

Andrew Barszcz
Estimator
Rizzo Corporation
64 Triangle Street
Danbury, CT 06810
203-731-3132, ext 1808
203-748-8747-fax
<http://www.rizzocorporation.com>

AA/EOE Employer

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Rebecca Bouchard

From: Dean Petrucelli
Sent: Friday, January 03, 2014 12:13 PM
To: 'joanne@bayukgraphics.com'
Cc: Paul Jorgensen; Rebecca Bouchard
Subject: RE: Crystal Lake Elementary

Hi joanne,

The cast letter reference was left unintentionally in our specifications and will be eliminated via an addendum that is being issued today.

In the meantime, you can assume that there are no cast letters on this project.

Thanks

dean

From: joanne@bayukgraphics.com [<mailto:joanne@bayukgraphics.com>]
Sent: Friday, January 03, 2014 11:48 AM
To: Dean Petrucelli
Subject: Crystal Lake Elementary

Dean, We are a specified supplier on the above mentioned job, section 101400 - Signage. Section 2.3 Dimensional Characters, in the specifications, requests cast letters. I have not found any on the drawings. Will there be letters included on this job?

thanks.

Joanne Anderson, Estimator
Bayuk Graphic Systems, Inc.
PH: 610-407-0224
fX: 610-296-4002

CSI Form 13.1A

SUBSTITUTION
REQUEST FOR CAUSE

Project: Crystal Lake Elementary School Substitution Request Number: _____
 To: Bill Silver From: Champion Flooring
Silver Petrucci & Assoc Date: 12/17/13
 Re: Prior Approval A/E Project Number: 048-0058 EWR/PS
 Contract For: Town of Ellington

Specification Title: 096766 Fluid Applied Athletic Flooring Description: Aacer Flooring, LLC - MP Sport
 Section: 2.1 Page: 2 Article/Paragraph: A

Proposed Substitution: MonoFlex 10+2
 Manufacturer: Champion Address: 1820 E 2nd Terrace Phone: 651-437-8813
Pittsburg, KS 66762
 Trade Name: MonoFlex Model No.: 10+2
 Installer: Champion Address: Same Phone: Same

History: ☐ New product ☐ 1-4 years old ☒ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: Nothing. We manufacture the
Key Components in the MP Sport Floor by Aacer
So they are basically the same with the same test results,
☒ Point-by-point comparative data attached — REQUIRED BY A/E I did not include because
there is nothing different.

Reason for not providing specified item: We are the manufacturer. Lower cost

Similar Installation: SEE ATTACHED LIST

Project: _____ Architect: _____
 Address: _____ Owner: _____
 Date Installed: _____

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: Can not determine at this time (\$ _____).

Proposed substitution changes Contract Time: ☒ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☒ _____

list of installs, ISO Certification, company history

SUBSTITUTION REQUEST FOR CAUSE (Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: CAROL WERKET
Signed by: Carol Werket
Firm: Champion Flooring, LLC
Address: 1820 E 27th Terrace PO Box 1174
Pittsburg, KS 66762
Telephone: 651-437-8813
Attachments: ☐

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: P. Jorgensen Date: 01.06.14

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E
☐ Other:

SUBSTITUTION REQUEST ()

Project: Ellington Crystal Lake Elementary School Substitution Request Number: _____

From: Shayla Kelley- Laboratory Solutions of New England
To: Silver/Petrucelli and Associates Date: December 13, 2013

A/E Project Number: NO. 12.140
Re: Substitution Request Phenolic Laboratory Casework Contract For: _____

Specification Title: Phenolic Laboratory Casework Description: Products
Section: 123553.15 Page: _____ Article/Paragraph: Cabinet and Table Materials

Proposed Substitution: Formica Compact phenolic resin

Manufacturer: Formica Address: Cincinnati, Ohio 45241 Phone: 718-649-1661(Representative)

Trade Name: Formica Compact Model No.: _____

Installer: TBD Address: _____ Phone: _____

History: ☐ New product ☐ 2-5 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between Manufacturer
proposed substitution
and specified product: _____

☐ Point-by-point comparative data attached - REQUIRED BY Fill in if required

Reason for not providing We would like to submit Formica as an approved equal for manufacturer. Please see attached product
specified item: information

Similar Installation:
Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST (Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Shayla Kelley

Signed by: _____ *Shayla Kelley*

Firm: Laboratory Solutions of New England

Address: 325 Boston Post Rd. Sudbury, MA 01776

Telephone: 617-607-3497

Attachments: Product Data Information Sheets, LEED Specification, Certificates, Test Reports

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: P. Jorgensen

Date: 01.06.14

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____



SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: Crystal Lake Elementary School Substitution Request Number: 001
Ellington CT
To: Mr. Dean Petrucelli From: Lori Clark (Focused Sales Associates)
Silver Petrucelli & Associates Date: December 27, 2013
Re: Insulated Roof Sheathing A/E Project Number: N/A
Contract For: Town of Ellington

Specification Title: Sheathing Description: Polyisocyanurate Foam Sheathing
Section: 061600 Page: 04 Article/Paragraph: 2.7 A. 1-4

Proposed Substitution: Vented Nailable Base-3
Manufacturer: Rmax Address: 13524 Welch Rd, Dallas TX 75244 Phone: 972-387-4500
Trade Name: N/A Model No.: N/A

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: Lori J Clark

Signed by: Lori Clark
Digitally signed by Lori Clark
DN: cn=Lori Clark, o=Focused Sales Associates, email=lori.clark@focusedsales.com, c=US
Date: 2013.12.27 15:22:26 -0500

Firm: Focused Sales Associates

Address: 32 Waterside Lane
Clinton CT 06413

Telephone: Lori Clark: 785-550-3034 Focuses Sales Associates/John Wagner: 203.892.2388

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: R. Bouchard Date: 01.06.14

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



SR #10

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: Crystal Lake Elementary School Expansion Substitution Request Number: _____
From: Kyle Lilly
To: Silver Petrucelli & Associates Date: December 13, 2013
Paul Jorgensen A/E Project Number: _____
Re: Product Substitution Request Contract For: _____
Specification Title: Fluid Applied Membrane Air Barriers Description: Vapor Impermeable Air & Moisture Barriers
Section: 072726 Page: 3 Article/Paragraph: 2.3

Proposed Substitution: Sto Guard Systems – Vapor Seal

Manufacturer: Sto Corp Address 3800 Camp Creek Atlanta, GA Phone: 214.660.0967
Trade Name: Sto Guard Model No.: 80263

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.

Submitted by: Kyle Lilly
Signed by: Kyle Lilly
Firm: Sto Corp
Address: 3800 Camp Creek Pkwy #1400
Atlanta, GA 30331
Telephone: 214.660.0967

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01330.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: R. BouchardDate: 01.06.14

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____



Knowledge for Creating
and Sustaining
the Built Environment

RECEIVED

SR #11 2014

SILVER PETRUCELLI & ASSOC., INC.

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: * Crystal Lake E.S. Substitution Request Number: (For Architect to fill in)
From: Greg Foulk-- Platinum Visual Systems
To: * Silver Petrucelli and Associates Date: 12/11/2013
Mr. Paul Jorgensen A/E Project Number: Unknown
Re: Substitution Request – Visual Display Units Contract For: Visual Display Units

Specification Title: Visual Display Units Description: Visual Display Units
Section: * 101100 Page: 3 Article/Paragraph: 2.2 A 1

Proposed Substitution: Visual Display Units
Manufacturer: Platinum Visual Systems Inc. Phone: (800) 498-2990
Address: 1451 E. Sixth St Corona, Ca. 91709
Trade Name: Visual Display Boards Model No.: BTS Series
Installer: N/A Phone: _____
Address: N/A

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☒ More than 10 years old

Differences between proposed substitution and specified product:

None. Please see attached spreadsheet with side by side product comparison.

☒ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____
Providing equal products by a manufacturer since 1964.

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: None (\$ _____).

Proposed substitution changes Contract Time: ☒ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: * Platinum Visual Systems Inc.

Signed by: *Rug Foul*

Firm: * Platinum Visual Systems Inc.

Address: * 1451 E. Sixth Street

Corona, Calif. 92879

Telephone: * Add submitters company phone number

Attachments: ☒

* Cover sheet, and comparison spreadsheet.

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: R. Bouchard

Date: 01.06.14

Additional Comments:
☐ Other:

☐ Contractor

☐ Subcontractor

☐ Supplier

☐ Manufacturer

☐ A/E



Product Comparison

Project: Crystal Lake E.S.

Section: 101100

Platinum Visual Systems

Specified

Visual Display Units

Markerboards

SERIES:	BTS Series -- Standard Trim	Claridge --- Standard Trim
FACE:	24 Ga. Porcelain Enamel Steel	24 Ga. Porcelain Enamel Steel
CORE:	1/2" Thick Particleboard	1/2" Thick Particleboard
BACKING:	0.005 Aluminum Sheet Backing	0.005 Aluminum Sheet Backing
MAPRAIL:	1" Maprail w/ Natural Cork Insert	1" Maprail w/ Natural Cork Insert
TRAY:	Box Type w/ End Closurers	Box Type w/ End Closurers

Tackboards

FACING:	1/4" Thick Bulletin Board Cork	1/4" Thick Bulletin Board Cork ???
FACING:	1/4" Thick Natural Cork	1/4 " Thick Natural Cork ???
BACKING:	1/4" Thick Hardboard	1/4" Thick Hardboard

1. The Platinum Visual System materials shown above are all equal to or exceed the requirements of the specifications for function and performance.
2. Tackboard material of 1/4" Colored or Natural Cork on 1/4" Hardboard is designed to provide you with 1/2" uniform thickness, same as the Markerboards.
3. Platinum Visual Systems factory assembled units come with angle clips at 16" or 24" on center and are also available in 16' single piece lengths if specified.

4. PLEASE NOTE CONFLICT IN REQUIRED CORK MATERIAL FOR TACKBOARDS AND ADVISE.

1/4" cork in color as indicated in Section 090000.



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: Crystal Lake Elem. School Substitution Request Number: _____
Ellington, CT From: Jimmie Sue Bible - The Atlas Companies
To: Silver Petrucci & Associates Date: 12/17/2013
Hamden, CT A/E Project Number: _____
Re: Substitution Request - Hollow Metal Contract For: _____

Specification Title: Hollow Metal Doors and Frames Description: _____
Section: 081113 Page: 4 Article/Paragraph: 2.1 A

Proposed Substitution: Alternate Manufacturer
Manufacturer: Metal Products Inc Phone: 606-523-0461
Address: 319 North Hills Road, Corbin, KY 40701
Trade Name: MPI Model No.: _____
Installer: _____ Phone: _____
Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☒ More than 10 years old

Differences between proposed substitution and specified product:

Alternate Hollow Metal

☒ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item:

Equal manufacturer to those in specifications

Similar Installation:

Project: Walnut Hills High School Architect: SHP Leading Design
Address: Cincinnati, OH Owner: _____
Date Installed: 2012

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: Not Known at this time (\$ _____).

Proposed substitution changes Contract Time: ☒ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Jimmie Sue Bible

Signed by: *Jimmie Sue Bible*

Firm: The Atlas Companies

Address: 5101 Commerce Crossings Drive

Louisville, KY 40229

Telephone: 502-779-2400

Attachments: ☒

*MPI Tech Data

*MPI Project Resume

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☒ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: R. Bouchard

Date: 01.06.14

Additional Comments:

☐ Contractor

☐ Subcontractor

☐ Supplier

☐ Manufacturer

☐ A/E

☐ Other:

**-Metal must be minimum gauge specified.
-Frame construction as specified.**



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: Crystal Lake Elementary School Substitution Request Number: _____
Ellington, CT
To: Silver Petrucci & Associates From: Jimmie Sue Bible- The Atlas Companies
Hamden, CT Date: 12/17/2013
Re: Substitution Request - Wood Doors A/E Project Number: _____
Contract For: _____

Specification Title: Wood Doors Description: _____
Section: 081416 Page: 6 Article/Paragraph: 2.3.A

Proposed Substitution: Alternate Manufacturer
Manufacturer: Oshkosh Door Compay Phone: (920)233-6161
Address: 2501 Universal Street Oshkosh, WI 54904
Trade Name: Oshkosh Door Company Model No.: _____
Installer: _____ Phone: _____
Address: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☒ More than 10 years old

Differences between proposed substitution and specified product:

Alternate Wood Door Manufacturer

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item:

Equal manufacturer to those in specifications

Similar Installation:

Project: Perry County Elementary School Architect: Ross-Tarrant Archts.
Address: Hazard, KY Owner: _____
Date Installed: 2012

Proposed substitution affects other parts of Work: ☒ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: Not Known at this time (\$ _____).

Proposed substitution changes Contract Time: ☒ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Jimmie Sue Bible

Signed by: Jimmie Sue Bible

Firm: The Atlas Companies

Address: 5101 Commerce Crossings Drive

Louisville, KY 40229

Telephone: 502-779-2100

Attachments: ☒

*Oshkosh Tech Data

*Oshkosh Project Resume

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☒ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed by: R. Bouchard

Date: 01.06.14

Additional Comments:

☐ Contractor

☐ Subcontractor

☐ Supplier

☐ Manufacturer

☐ A/E

☐ Other:

-Doors must meet HPBS requirements.

**SUBSTITUTION
REQUEST**

(During The Bidding Phase)

Project: Crystal Lake Elementary School Expansion

To: Rebecca Bouchard
Silver Petrucelli Associates

Re: Proposed "Equal" Toilet Compartments for Bidding

Substitution Request Nbr: _____

From: Jeremy Ross

Date: 12/22/13

A/E Project Number 12.140

Contract For: Toilet Compartments

Specification Title: Toilet Compartments

Section: 102113 Page: 2

Description: Solid Polymer Units

Article/Paragraph: 2.2

Proposed Substitution: General Partitions

Manufacturer: General Partitions Address: 1702 Peninsula Dr Eric, Pa Phone: 814-833-1154

Trade Name: General Partitions Mfg Corp Model No: See Attached

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted By: Jeremy Ross

Signed By: Jeremy Ross

Firm: K Ross Company

Address: 29 Main St Telephone: 508-317-5352
Kingston, MA 02364

A/E's REVIEW AND ACTION

- ☒ Substitution approved - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01330.
- ☐ Substitution rejected - Use specified materials.
- ☐ Substitution Request received too late - Use specified materials.

Signed By: R. Bouchard

Date: 01.06.14

Supporting Data Attached: ☐ Drawings ☒ Product Data ☐ Samples ☐ Tests ☐ Reports

SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Refrigeration appliances.
 - 2. Cleaning appliances.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include installation details, material descriptions, dimensions of individual components, and finishes for each appliance.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. HPBS Submittals:
 - 1. Product Data for Section 16a-38k-3(d): For appliances indicated, documentation that products are ENERGY STAR rated.
- C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard size.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Sample Warranties: For manufacturers' special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each residential appliance to include in operation and maintenance manuals.

1.6 WARRANTY

- A. Special Warranties: Manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain residential appliances from single source.

2.2 PERFORMANCE REQUIREMENTS

- A. Electrical Appliances: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with applicable provisions in the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

2.3 REFRIGERATOR/FREEZERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Danby (D)
 - 2. General Electric Company (GE).
 - 3. Maytag; a division of Whirlpool Corporation.
 - 4. Whirlpool Corporation.
 - 5. Substitutions: Under provisions of Section 012500 "Substitution Procedures".
- B. Refrigerator/Freezer: Two-door refrigerator/freezer with freezer on top and complying with AHAM HRF-1.
 - 1. Basis-of-Design Product: **GE GTZ18ICISS**
 - 2. Type: Freestanding.
 - 3. Dimensions:
 - a. Width: 29½ inches.
 - b. Depth: 32-1/8 inches.
 - c. Height: 66-5/8 inches.
 - 4. Storage Capacity:
 - a. Refrigeration Compartment Volume: 18.0 cu. ft.
 - b. Freezer Volume: 5.09 cu. ft.
 - c. Shelf Area: Three (3) adjustable glass shelves, 22.6 sq. ft.
 - 5. Refrigerator Features:
 - a. Interior light in refrigeration compartment.
 - 6. Freezer Features: One (1) freezer compartments.
 - a. Automatic defrost.
 - b. Automatic icemaker and storage bin.

7. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.
 8. Appliance Color/Finish: Stainless steel.
- C. Refrigerator/Freezer: One-door refrigerator with freezer compartment inside and complying with AHAM HRF-1.
1. Basis-of-Design Product: **D DCR122BSLDD**
 2. Type: Undercounter.
 3. Dimensions:
 - a. Width: 20½ inches.
 - b. Depth: 21-1/16 inches.
 - c. Height: 32-11/16 inches.
 4. Storage Capacity:
 - a. Refrigeration Compartment Volume: 4.3 cu. ft.
 - b. Shelf Area: Two (2) full shelves and one (1) half shelf.
 5. Freezer Features: One (1) freezer compartment with door.
 - a. Manual defrost.
 6. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.
 7. Front Panel(s): Stainless steel.
 8. Appliance Color/Finish: Black.

2.4 DISHWASHERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. General Electric Company (GE).
 2. Maytag; a division of Whirlpool Corporation.
 3. Whirlpool Corporation.
 4. Substitutions: Under provisions of Section 012500 “Substitution Procedures”.
- B. Dishwasher: Complying with AHAM DW-1.
1. Basis-of-Design Product: **GE GLDA696FSS**.
 2. Type: Built-in undercounter.
 3. Dimensions:
 - a. Width: 24 inches.
 - b. Depth: 24 inches.
 - c. Height: 32-7/20 inches.
 4. Sound Level: Maximum 56 dBA.

5. Tub and Door Liner: Stainless steel with sealed detergent and automatic rinsing-aid dispensers.
6. Rack System: PVC-coated sliding dish racks, with removable cutlery basket.
7. Controls: Touch-pad controls with four (4) wash cycles and hot-air and heat-off drying cycle options.
8. Features:
 - a. Lock-out feature.
 - b. Delay-wash option.
 - c. Digital display panel.
9. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product-labeling program.
10. Appliance Color/Finish: Stainless steel.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and performance of residential appliances.
- B. Examine roughing-in for piping systems to verify actual locations of piping connections before appliance installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install appliances according to manufacturer's written instructions.
- B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

END OF SECTION 113100

SECTION 01 5713 - TEMPORARY EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation of temporary erosion and sedimentation control measures
2. Maintenance of temporary erosion and sedimentation control measures.
3. Monitoring of site condition and installation of supplemental temporary erosion and sedimentation control measures.
4. Sediment removal and disposal
5. Temporary seeding or other surface stabilization measures.
6. Removal of temporary erosion and sedimentation control measures.
7. Monitoring, documentation, and recordkeeping.
8. Installation of permanent erosion control materials.
9. Final cleanup.

B. Erosion and sediment control techniques include, but are in no way limited to, silt fence, hay bales, drainage structure inserts/filters, mulching with hay/straw, netting/matting, grassing, stone dikes/berms/check-dams, compost blankets and berms, barriers, diversions, traps, basins, and appurtenances which will ensure that erosion and sediment pollution will be either eliminated or maintained within acceptable limits.

C. The measures specified herein are the minimum requirements which Contractor shall comply to control erosion and siltation throughout execution of the work. Contractor shall provide additional work if necessary to control erosion and siltation throughout the duration of the construction as conditions dictate, or as directed by Engineer.

1.2 SUBMITTALS

- A. Submit material specifications and shop drawings for all materials furnished under this Section.
- B. Prior to the start of the construction, submit schedule for the construction of required stormwater detention basins, temporary and permanent erosion and sedimentation control measures, clearing and grubbing, grading, structures at watercourses, construction, and paving.
- C. During construction, submit to Engineer schedule changes that affect timing of construction.
- D. Submit copies of all inspection and maintenance report forms.

1.3 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Regulations of Connecticut State Agencies (RCSA)
 - 1. 22a-315-10 through 19, Soil and Water Conservation
- C. Connecticut Department of Energy and Environmental Protection (DEEP)
 - 1. Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34, State of Connecticut Council on Soil and Water Conservation, 2002.
- D. State of Connecticut Department of Transportation (ConnDOT)
 - 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 and any supplements.

1.4 PERMIT CONDITIONS

- A. Contractor and Subcontractors are bound to comply with any project-related permits obtained by Owner or Engineer for the work of the project. Such permits will affect performance of the work, and Contractor and Subcontractors are bound to comply with requirements of such permit and representations contained in permit application as though Contractor and Subcontractor were the Permittee/permit-holder. Requirements and conditions set forth in Owner or Engineer-obtained project-related permits and permit applications shall be binding on Contractor just as any Specification would be.

1.5 QUALITY CONTROL

- A. If applicable, comply with applicable provisions of the Connecticut Department of Energy and Environmental Protection (DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities, (DEP-PED-GP-015) modified April 8, 2004 or latest revision thereof. Conditions of such General Permit, other conditions of approval or authorizations, and associated Stormwater Pollution Control Plan (SWPCP) shall become part of the Contract Documents.
- B. Contractor shall be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the erosion of soil or movement of sediment from construction activities to off-site areas via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of Contractor.
- C. Engineer has the authority to order immediate, additional, temporary control measures to prevent contamination of adjacent streams or other watercourses, or other areas of water impoundment and damage by erosion.
- D. If Engineer observes construction procedures and operations that jeopardize erosion control provisions, Engineer will notify Contractor. If such construction procedures and operations are not corrected promptly, Engineer may suspend the performance of any or all construction until corrections have been made, and such suspension shall not be the basis of any claim by Contractor for additional compensation, nor for an extension of time to complete the Work.

- E. Should construction materials be washed away or otherwise rendered ineffective in the opinion of Engineer during the progression of the Work, Contractor shall replace the installations at no additional cost to the Owner.

1.6 COORDINATION WITH PERMANENT EROSION CONTROL PROVISIONS

- A. The temporary control provisions shall be coordinated with the permanent erosion control features to the extent practical to ensure economical, effective and continuous erosion control throughout the construction and post-construction period.

PART 2 PRODUCTS

2.1 HAY BALES

- A. Hay bales shall be made of cut hay with forty pounds minimum weight and 120 pounds maximum weight. Bales shall be free of rotten or degraded hay, significant splits or voids. Hay bales shall be held together with a minimum of two bands made of either wire or heavy twine.
- B. Stakes to anchor the bales shall be a minimum of 36 inches long and made of hardwood with a minimum dimension of 1½-inch by 1½-inch normal size. Metal stakes may be used instead of wooden stakes. Metal stakes shall be round, “U”, “T”, “L”, or “C” shaped with a minimum weight of 0.5 pounds per foot.
- C. Replace individual hay bales upon loss of 30% of original mass or volume, whichever is less.

2.2 SILT FENCE

- A. Woven Polypropylene geotextile having a minimum weight of 3.1 ounces per square yard conforming to the following:

Mechanical and Physical Properties of Silt Fence Geotextile

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Weight	ASTM D 3776	oz/yd ²	5.6
Grab Tensile Strength	ASTM D 4632	Pounds	60
Grab Elongation (Max percent)	ASTM D 4632	Percent (%)	15-30
Trapezoidal Tear	ASTM D 4533	Pounds	30
Puncture	ASTM D 4833	Pounds	30

Mullen Burst	ASTM D 3786	psi	150-200
Permittivity	ASTM D 4491	Sec ⁻¹	0.15
Flow Rate	ASTM D 4491	gal/min/ft ²	15-20
Apparent Opening Size	ASTM D 4751	(U.S. Sieve)	30-35
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	70

- B. Silt fence shall be constructed of a minimum thirty-six (36) inch wide continuous woven geotextile. The material shall have a high sediment filtration capacity, high slurry flow and minimum clogging characteristics. Edges of the fabric shall be finished to prevent the outer fibers from pulling away from the geotextile. Geotextile shall be free of defects or flaws that significantly affect its physical and/or filtering properties.
- C. Fabric shall be securely fastened to stakes a minimum of 42 inches long and made of hardwood with a minimum dimension of 1½ inch by 1½ inch normal size such that a 6 to 8 inch length of fabric is unattached at the bottom for anchorage in soil. Metal stakes may be used instead of wooden stakes. Metal stakes shall be round, “U”, “T”, “L”, or “C” shaped with a minimum weight of 0.5 pounds per foot. Stakes shall be spaced not greater than ten feet apart. When required, wire or another type of support shall be constructed between the geotextile fabric and the posts to improve the load carrying capacity of the silt fence.

2.3 CATCH BASIN INSERT

- A. Manufactured catch basin insert of woven polypropylene geotextile with integral lifting loops or straps conforming to the following:

Mechanical and Physical Properties of Catch Basin Insert

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value
Grab Tensile Strength	ASTM D 4632	Pounds	350
Grab Elongation (Max percent)	ASTM D 4632	Percent (%)	30
Trapezoidal Tear	ASTM D 4533	Pounds	120
Puncture	ASTM D 4833	Pounds	140

Mullen Burst	ASTM D 3786	psi	600
Permittivity	ASTM D 4491	gal/min/sq ft	0.3
Flow Rate	ASTM D 4491	gal/min/ft ²	150
Apparent Opening Size	ASTM D 4751	(U.S. Sieve)	40
UV Resistance (at 500 hours)	ASTM D 4355	% strength retained	90

Note: Catch basin inserts for catch basins with curb openings shall be equipped with integral curb deflector.

2.4 STRAW MULCH

- A. Straw mulch shall be comprised of threshold straw of oats, wheat, barely, or rye that is free from noxious weeds, mold or other objectionable material. Straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment. Straw mulch shall be utilized on all newly graded areas with slopes exceeding 5% to protect areas against washouts and erosion unless other erosion control measures are provided.

2.5 FILTER BERM COMPOST

- A. Where establishing vegetation is not planned, compost shall be a decomposed, weed free organic matter source derived from agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. Compost shall possess a moisture content of 30 to 60% and a organic matter content of 25 to 100%. The maximum particle length shall be 6", and 100% passing a 3", 90 to 100% passing a 1", 70% to 100% passing a 3/4", and 30% to 75% passing a 1/4" screen. However, no more than 50% passing a 1/4" screen in high rainfall/flow rate situations.
- B. Where establishing vegetation is planned, compost shall be use a well decomposed, stable, weed free organic matter source derived from agricultural, food, or industrial residuals; biosolids (treated sewage sludge); yard trimmings; or source-separated or mixed solid waste. Compost shall possess a moisture content of 30 to 60%, a pH of 6.0 to 8.5 and an organic matter content of 25 to 65%. The maximum particle length shall be 6', and 100% passing a 3", 90 to 100% passing a 1", 70% to 100% passing a 3/4", and 30% to 75% passing a 1/4" screen. However, no more than 60% passing a 1/4" in high rainfall/flow rate situations. It shall contain no substances toxic to plants, shall possess no objectionable odors, and shall not resemble the raw material from which it was derived.

2.6 COMPOST SOIL BLANKET

- A. Compost soil blankets may be utilized on slopes of up to 2:1.

- B. Slightly scarify slopes and remove large clods, rocks, stumps, roots larger than 2 inches in diameter and debris on slopes, where vegetation is to be established. This soil preparation step may be eliminated where approved by the Landscape Architect/Designer, or where seeding or planting isn't planned. Track (compact) slope using a bulldozer before applying compost.
- C. Apply compost at the following rates:

Compost Application Rates

Annual Rainfall/Flow Rate	Total Precipitation & Rainfall Erosivity Index	Application Rate for Slopes to be Vegetated (Note 1)	Application Rate for Slopes not being Unvegetated
Low	1-25" & 20 - 90	$\frac{1}{2}$ - $\frac{3}{4}$ "	1" - 1 $\frac{1}{2}$ "
Average	26-50" & 91 - 200	$\frac{3}{4}$ - 1"	1 $\frac{1}{2}$ " - 2"
High	51" and above, & 201 and above	1-2"	2-4"

- D. Lower application rates indicated for slopes to be vegetated should only be used in conjunction with seeding, and for compost blankets applied during the prescribed planting season for the particular region.
- E. Compost shall be uniformly applied using an approved spreader unit, including bulldozers, side discharge manure spreaders, etc. Track (compact) the compost layer using a bulldozer or other appropriate equipment. (This step may be eliminated where impractical or where deemed unnecessary by the Landscape Architect/Designer.) Alternatively, apply compost using a pneumatic (blower) unit, or other unit that propels the product directly at the soil surface, thereby preventing water from moving between the soil-compost interface. Thorough watering may be used to improve settling of the compost. Apply compost layer approximately 3 feet (90 cm) over the top of the slope, or overlap it into existing vegetation.
- F. On highly unstable soils, use compost in conjunction with appropriate structural measures.
- G. Dry or hydraulic seeding may be completed following compost application, as required, or during the compost application itself, where a pneumatic unit is used to apply the compost.

2.7 STONE CHECK DAM

- A. Stone shall be graded as follows:

Gradation of Stone for Check Dam (ConnDOT M.01.01 Grading No. 3)

Sieve	Percent Passing by Weight
2 1/2"	100
2"	90-100
1 1/2"	35-70
1	0-15
1/2"	0-5

Stone shall be sound, tough, durable, angular, not subject to disintegration, on exposure to water, or weathering, be chemically stable and shall be suitable in all other respects for the purpose intended.

- B. Geotextile may be used under the stone to provide a stable foundation and to facilitate removal of the stone.

2.8 EROSION CONTROL SEED MIXTURE

Erosion Control Seed

Species (Note 1)	Application Rate, Pounds Per Acre	Application rate, Pounds Per 1,000 sf	Optimum Seed Depth, inches (Note 2)	Optimum Seeding Dates (Note 3)
Annual ryegrass <i>Lolium multiflorum</i>	40	1.00	0.5	3/1 - 6/15 and 8/1 - 10/15
Perennial ryegrass <i>Lolium perenne</i>	40	1.00	0.5	3/15 - 7/1 and 8/1 - 10/15
Winter Rye <i>Secale cereale</i>	120	3.00	1.00	4/5 - 7/1 and 8/15 - 10/15
Oats <i>Avena sativa</i>	86	2	1	3/1 - 6/15 and 8/1 - 9/15
Winter Wheat <i>Triticum aestivum</i>	120	3	1	4/15 - 7/1 and 8/15 - 10/15

TEMPORARY EROSION AND SEDIMENTATION CONTROLS

Millet Echinochloa crusgalli	20	.5	1	5/15 - 7/15
Sudangrass Sorghum sudanese	30	.7	1	5/15 - 8/1
Buckwheat Fagopyrum esculentum	15	.4	1	4/1 - 9/15
Weeping lovegrass Eragostis cymbula	5	.2	.25	6/1 - 7/1
ConnDOT All Purpose Mix	150	3.4	.5	3/1 - 6/15 and 8/1 - 10/15

Notes:

1 - Listed species may be used in combinations to obtain a broader time spectrum. If used in combinations, reduce each species planting rate by 20% of that listed.

2 - Seed at twice the indicated depth for sandy soils.

3 - May be planted throughout summer if soil moisture is adequate or can be irrigated. Fall seeding may be extended 15 days in the coastal towns.

2.9 EROSION CONTROL MATTING

- A. Temporary Erosion Control Blanket shall be 1) Curlex® Excelsior Blanket, as manufactured by American Excelsior Company, 2) ERO-MAT® V75S(FD), as manufactured by Verdyl Plant Research, Ltd., or 3) Landlok® S2 RD, as manufactured by SI® Geosolutions, or 4) approved equal.
- B. Degradable Erosion Control Fabric Netting shall be Landlok® 407 GR, as manufactured by 1) SI® Geosolutions, or 2) GeoJute® as manufactured by Belton Industries, Inc., or 3) BioNet® S150BN™ Double Net Straw Blanket, as manufactured by North American Green, or 4) approved equal.
- C. Long-Term and Non-degradable Turf Reinforcement Mats shall be 1) Pyramat®, as manufactured by SI® Geosolutions, or 2) Recyclex® Turf Reinforcement Matting, as manufactured by American Excelsior Company, or 3) Vmax3 C350™, as manufactured by North American Green, or 4) approved equal.
- D. Erosion control matting shall be secured with staples or an alternative attachment device such as geotextile pins or plastic pegs as recommended by the manufacturer. The

Contractor shall submit a sample of the alternative attachment device for the Engineer's approval prior to installation.

PART 3 EXECUTION

3.1 GENERAL

- A. Install erosion and sedimentation control measures as shown on the Drawings prior to any site disturbance.
- B. No work shall be started until erosion control schedules and installation have been accepted by the Engineer.
- C. Engineer has the authority to control the surface area of each material exposed by construction operations and to direct Contractor to immediately provide permanent or temporary pollution control measures to prevent contamination of adjacent watercourses or other areas of water impoundment. Every effort shall be made by Contractor to prevent erosion on the site and abutting properties or areas.
- D. Contractor shall construct all permanent erosion and sediment control features at the earliest practical time as outlined in the accepted schedule. Temporary erosion and sediment control measures shall be used to correct conditions that develop during construction, which were unforeseen, but are needed prior to installation of permanent control features, or that are needed temporarily to control erosion or sedimentation which develops during construction operations.
- E. Contractor shall limit as necessary the surface area of the earth material exposed to sufficiently maintain and protect the slopes to prevent pollution. Where erosion is likely to be a problem, clearing and grubbing operations shall be scheduled and performed so that grading operations and permanent erosion and sediment control features can follow immediately thereafter, if conditions permit; otherwise, temporary control measures will be required between successive construction stages.
- F. Erosion control features installed by Contractor shall be maintained by Contractor, and he shall remove such installations only upon completion of the work and the site is stabilized or when authorized to do so by Engineer.
- G. Contractor shall operate all equipment and perform all construction operations so as to minimize pollution. Contractor shall cease any of his operations, which will increase pollution during rainstorms.
- H. Failure by Contractor to control erosion, pollution, and siltation shall be cause for the Engineer to employ outside assistance to provide the necessary corrective measures. The cost of such assistance, including engineering costs, will be charged to Contractor and appropriate deductions made to Contractor's payment.

3.2 HAY BALES

- A. Hay bales shall be positioned as indicated on the Drawings and/or as necessary to prevent off site movement of sediment produced by, or as a result of, construction activities, or as direct by the Engineer.

- B. Hay bales shall be utilized on all catch basins and drainage facilities on the Project Site to prevent the entry of sediments or other debris. Maintain such protection throughout execution of the work until such drainage facilities have been abandoned/removed.
- C. Bales shall be placed lengthwise with ends of adjacent bales tightly abutting one another to form a continuous barrier. Bales shall be entrenched to a depth of 4 inches and backfilled, with the backfill placed toward the potential source of runoff and sediment. All bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms. Each bale shall be anchored with a minimum of two stakes, driving the first stake in each bale towards the previously laid bale to drive the bales together. Stakes must be driven a minimum of 18 inches into the ground. Loose hay shall be inserted between bales as required to prevent water from escaping between the bales.

3.3 GEOTEXTILE SILT FENCE

- A. Install a filter fabric silt fence prior to construction and remove after full surface restoration has been achieved. Install silt fence as indicated on the Drawings and/or as necessary to prevent off site movement of sediment produced by, or as a result of, construction activities.
- B. Install as follows:
 - 1. Hand shovel excavate a small trench a minimum of six inches wide by six inches deep on the upslope side of the desired fence line location.
 - 2. Unroll the siltation fence system, position the post in the back of the trench (downhill side), and hammer the post at least 12 inches into the original ground.
 - 3. Fabric rolls shall be spliced at posts. The fabric shall be overlapped six inches, folded over and securely fastened to posts.
 - 4. Lay the bottom 6 inches of the fabric into the trench to prevent undermining by storm water run-off.
 - 5. Backfill the trench and compact. Compaction is necessary to prevent the run-off from eroding the backfill.
 - 6. For slope and swale installations, extend the ends of the trench sufficiently up slope such that the bottom end of the fence will be higher than the top of the lowest portion of the fence.

3.4 CATCH BASIN INLET SEDIMENT CONTROL

- A. Install catch basin inlet sediment control devices in each exiting catch basin as long as it remains in use in accordance with manufacturer's guidelines at the locations shown on the Drawings.
- B. A catch basin sediment filter shall be installed and changed/cleaned per the manufacturer's recommendations, or as directed by the (Insert Name), during construction.
- C. New catch basins shall have a filter installed immediately upon completion of construction. In addition, a hay bale, or similar, barrier shall be installed around the new basin and maintained in place until binder is placed or disturbed areas draining to it are stabilized.

- D. Catch basins with curb openings shall have filter fabric covering the opening and the edges of the fabric shall be secured. A filter boom shall also be placed over the opening.

3.5 TEMPORARY SEDIMENT BASINS

- A. Temporary sedimentation basins shall be employed as required during construction. Sedimentation shall be periodically removed from the basins and from behind erosion and sedimentation control devices. The Contractor shall direct all possible site runoff to the temporary sedimentation basins.
- B. The temporary sedimentation basins shall be maintained from the start of construction until construction of the permanent detention basins is completed and perimeter areas are stabilized.

3.6 TEMPORARY MULCHING

- A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 calendar days of the completion of rough grading or where final grading has been completed but seeding is not anticipated for 20 days.
 - 1. Straw/Hay Mulch
 - Exposure Period: 6 months
 - Application Method: By hand or machine
 - Application Rate: 110 lbs/1,000 square feet.
 - 2. Bark Chips/Shredded Bark
 - Exposure Period: Less than one year
 - Application Method: By hand or machine
 - Application Rate: 6 cubic yards /1,000 square feet.

3.7 TEMPORARY EROSION CONTROL MATS

- A. Erosion control mats shall be furnished, installed, maintained, and later removed in ditches or swales, on embankment slopes, and excavation slopes at the locations shown on the Drawings in accordance with the manufacturer's recommendations.
- B. All areas shall be smooth graded and compacted. Remove all rocks, dirt clods, vegetation and other obstructions that may cause damage to the mats.
- C. Unroll mats parallel to the direction of water flow and lay flat against the ground. Overlap roll ends 1-2 feet with upslope mat on the top to prevent uplift of mat end by water flow. Overlay adjacent edges of mat by six inches. Extend mat 2-3 feet above the crest of steep slopes and anchor by excavating a 6-inch deep trench, and secure end of mat in trench, backfill and compact. Secure mat to the ground using staples or pins furnished by manufacturer of mat.
- D. When no longer required, as determined by the Engineer, temporary erosion control mats shall become the property of the Contractor and be removed and properly disposed.

- E. Ground disturbances, including holes and depressions caused by the installation and removal of the temporary erosion control blanket shall be backfilled and repaired.

3.8 INSPECTIONS AND MAINTENANCE

- A. Contractor is responsible to maintain the sediment and erosion control features at all times throughout the project duration and until the completion certification and approval has been issued.
- B. Regular erosion and sediment control system inspections shall be conducted by Contractor throughout the project duration. At a minimum, Contractor shall conduct daily inspections and maintain erosion control systems in good operating condition. Report the results of the inspection and the recommended maintenance and/or repair requirements to Engineer.
- C. Additional inspections may be required and/or directed prior to, or immediately following, a storm event >0.1 inches. Repairs shall be made as necessary.
- D. In the event that the sedimentation and erosion control measures employed by Contractor prove to be inadequate as determined by the Engineer, Contractor shall adjust operations to the extent necessary to prevent erosion and sediment transport.
- E. Surface water shall be pumped to maintain excavations free of water. Comply with applicable requirements of the Connecticut Department of Environmental Protection, specifically those requirements related to the management of stormwater and dewatering wastewaters associated with construction activities.
- F. Hay bales and/or silt fences.
 - 1. Remove accumulated sediment once it builds up to one-half of the height of the bale or fabric.
 - 2. Replace damaged or degraded bales as necessary or when directed by the Engineer.
 - 3. Replace damaged fabric, or patch with a 2-ft minimum overlap. Overlaps may only be made at fence posts.
 - 4. Make other repairs as necessary to ensure that the bales/fence is filtering all runoff.
- G. Erosion Control Mats shall be inspected at least once a week. Areas where the mat has become dislodged from the soil surface or become torn shall be re-graded and re-seeded as necessary and the mat re-installed. When repetitive failures occur at the same location review conditions and modify erosion control measures to reduce failure rate. Temporary erosion control blanket damaged during the progress of work or resulting from the Contractor's vehicles, equipment, or operations shall be repaired or replaced at the expense of the Contractor.
- H. Clean catch basin inlet sediment control devices in accordance with manufacturer's guidelines.
- I. Any catch basins that collect sediment as a result of Contractor's work shall be thoroughly cleaned out by Contractor.

END OF SECTION

SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Thin-set, epoxy-resin terrazzo flooring.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealants installed with terrazzo.

1.3 DEFINITIONS

- A. Aggregate: Marble chips or other types of aggregate.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to terrazzo including, but not limited to, the following:
 - a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Review special terrazzo designs and patterns.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. HPBS Submittals:
 - 1. Product Data for Section a6a-38k-6(d)(8): For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
 - 2. Product Data for Section 16a-38k-5(d): For adhesives and sealers, documentation including printed statement of VOC content.

- C. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

- 1. Divider strips.
- 2. Control-joint strips.
- 3. Terrazzo patterns.

- D. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.
- B. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- C. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.10 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.
- B. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

- C. Close spaces to traffic during terrazzo application and for not less than twenty-four (24) hours after application unless manufacturer recommends a longer period.
- D. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

2.2 EPOXY-RESIN TERRAZZO

- A. Epoxy-Resin Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.

- 1. Manufacturers:

- a. General Polymers; Sherwin Williams
 - b. Master Terrazzo Technologies
 - c. Terrazzo & Marble Supply Companies
 - d. Substitutions: Under provisions of Section 012500 "Substitution Procedures".

- 2. Thickness: Match existing.

- 3. Custom Mix Color and Pattern: Match existing, providing for six (6) colors.

- B. Materials:

- 1. Primer: Manufacturer's product recommended for substrate and use indicated.
- 2. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.

- a. Physical Properties with Aggregates: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide"; comply with the following:

- 1) Flammability: Self-extinguishing, maximum extent of burning ¼ inch per ASTM D 635.
 - 2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F (0.0025 mm/mm per 0.5556 deg C) for temperature range of minus 12 to plus 140 deg F (minus 24 to plus 60 deg C) per ASTM D 696.

- 3. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.

- a. Abrasion and Impact Resistance: Less than forty percent (40%) loss per ASTM C 131.
 - b. 24-Hour Absorption Rate: Less than 0.75 percent.

- c. Dust Content: Less than one percent (1%) by weight.
- d. Recycled Content of Epoxy-Resin Terrazzo: Postconsumer recycled content plus one-half of preconsumer recycled content not less than ten percent (10%).

- 4. Finishing Grout: Resin based.

2.3 STRIP MATERIALS

- A. Thin-Set Divider Strips: L-type angle, ¼ inch deep.
 - 1. Material: Aluminum as a minimum but to match existing.
 - 2. Top Width: Match existing.
- B. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.

2.4 MISCELLANEOUS ACCESSORIES

- A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use.
 - 1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Anchoring Devices:
 - 1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and required for secure attachment to substrate.
- C. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- D. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.
- E. Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- F. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.
 - 1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
 - 2. Acid-Base Properties: With pH factor between 7 and 10.
 - 3. Sealers shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.
- B. Concrete Slabs:
 - 1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.
 - c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
- C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
 - 1. Moisture Testing: Perform tests indicated below.
 - a. Test Method: Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.
- D. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

- A. Comply with NTMA's written recommendations for terrazzo and accessory installation.
- B. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."

- C. Installation Tolerance: Limit variation in terrazzo surface from level to ¼ inch in 10 feet; noncumulative.
- D. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
- E. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
- F. Primer: Apply to terrazzo substrates according to manufacturer's written instructions.
- G. Strip Materials:
 - 1. Divider and Control-Joint Strips:
 - a. Locate divider strips in locations indicated in shop drawings.
 - b. Install control-joint strips back to back directly above concrete-slab control joints.
 - c. Install control-joint strips with ¼-inch gap between strips, and install sealant in gap.
 - d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

3.4 REPAIR

- A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.5 CLEANING AND PROTECTION

- A. Cleaning:
 - 1. Remove grinding dust from installation and adjacent areas.
 - 2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.
- B. Sealing:
 - 1. Seal surfaces according to NTMA's written recommendations.
 - 2. Apply sealer according to sealer manufacturer's written instructions.
- C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION 096623

SECTION 10 1453 - TRAFFIC SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Installation of new signs and sign supports.
 - 2. Removal of existing signs.
- B. Contractor shall coordinate work between all Subcontractors, sections, and trades required for the proper completion of the work.
- C. Contractor is responsible for all health and safety.

1.2 SUBMITTALS

- A. Shop Drawings
 - 1. Submit shop drawings of all work of this Section. Do not order material or begin fabrication until the approval of Engineer has been obtained.
 - 2. Show the size and thickness of all members, types of materials, methods of construction and assembly method and type of surface treatment, complete dimensions, hangers, brackets, anchorage, relationship to surrounding work by other trades, shop finishes, sign designs, layouts, and lettering, and other pertinent details of fabrication and installation.

1.3 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. State of Connecticut Department of Transportation (ConnDOT)
 - 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 and any supplements.
- C. Code of Federal Regulations (CFR)
 - 1. 29 CFR 1926, Safety and Health Regulations for Construction
- D. American Society for Testing and Materials (ASTM)
 - 1. ASTM A1 - Standard Specification for Carbon Steel Tee Rails.
 - 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - 4. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners.

5. ASTM A499 - Standard Specification for Steel Bars and Shapes, Carbon Rolled from T Rails.
 6. ASTM A563 - Standard Specification for Carbons and Alloy Steel Nuts.
 7. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 8. ASTM B449 - Standard Specification for chromates on Aluminum.
 9. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 10. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework.
- E. American Association of State High and Transportation Officials (AASHTO).
1. Roadside Design Guide, latest edition.
 2. Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways, latest edition.
 3. AASHTO M 268 - Standard Specification for Retroreflective Sheeting for Traffic Control.
- F. United States Department of Transportation, Federal Highway Administration (FHWA).
1. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest edition.
 2. Standard Highway Signs Including Pavement Markings and Standard Alphabets, latest edition.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a timely manner.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store work under these Sections in a manner to prevent cracking, chipping or stress of the components, and to prevent mechanical damage or damage by the elements.
- B. Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GENERAL

- A. All signs furnished under this Section shall comply with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), latest edition.

2.2 SIGN FACE - SHEET ALUMINUM

- A. Aluminum sign blanks shall be constructed of sheet aluminum, alloy 6061-T6 or alloy 5052-H38, ASTM B 209.
- B. Blanks shall be degreased and etched in accordance with the recommendations of the sheeting manufacturer or treated with a light, tightly adherent chromate conversion coating, free of any powdery residue, ranging in color from silvery iridescent to a pale yellow, ASTM B 449, Class 2 (10-35 milligrams/square foot) with 25 milligrams/square foot as the optimum coating. Thickness shall be as specified on the Drawings.
- C. The following thickness and mounting, unless otherwise specified:

Thickness of Sign Face Sheet Aluminum

Area of Sign (Square Feet)	Mounting	ConnDOT Thickness (Inches)	Municipal Thickness (Inches)
Less than 10	Single Post	A	.080
Between 10 and 20	Two Posts	B	.080
Between 6 and 25	Single Post (Top Mounted)	C	.080

- D. The fabrication of aluminum sign blanks including cutting to size and shape and the punching of mounting holes shall be completed prior to metal degreasing and the application of reflective sheeting. Aluminum sign blanks shall be free of buckles, warp, dents, cockles, burrs and defects resulting from fabrication.

2.3 REFLECTIVE SHEETING

- A. Reflective Sheeting shall meet the requirements of AASHTO M 268. Reflective sheeting for sign panel faces shall meet the requirements of AASHTO M 268 for Type II and/or III as required by the contract documents. Class 1 or 2 adhesive, and color per the FHWA MUTCD and the AASHTO Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways.
- B. Reflective sheeting shall be applied in such a manner that the finished sign will be wrinkle and bubble free. No splices of the reflective sheeting will be permitted on any sign face under 30 square feet in area with one dimension of 4 feet or less and no more than one splice will be permitted on any one sign without the approval of Engineer.

2.4 LEGENDS

- A. Permanently Applied Legends
 - 1. Permanently applied legends shall be reflective or opaque sheeting applied directly to clean, dust-free background in a manner specified by the sheeting manufacturer.
 - 2. Heat activated adhesive-coated material shall be applied only by mechanical means.
 - 3. Pressure sensitive, adhesive-coated materials shall be applied only by hand means.
 - 4. Finishes shall be as recommended by and in a manner as specified by the sheeting manufacturer.
 - 5. Legends shall be neatly cut.

2.5 SILK SCREEN PROCESSED

- A. The legends shall be of the series and size specified in AASHTO “Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways”, and the dimension and details of the letters with respect to each series shall be as specified in FHWA “Standard Highway Signs Including Pavement Markings and Standard Alphabets”, or as shown on the Drawings.

2.6 SIGN SUPPORTS

- A. Flanged U-Channel Post.
 - 1. Carbon steel, ASTM A 499 Grade 60 and chemical requirements of ASTM A1.
 - 2. ConnDOT Type “A” post: 3.00 pounds/lf.
 - 3. ConnDOT Type “B” post: 4.00 pounds/lf.
 - 4. Retainer spacer strap: Galvanized steel, ASTM A123. Formed and dimensioned as shown on the Drawings.
 - 5. Post assembled in ConnDOT “breakaway” configuration, Type 1, as indicated on the Drawings. Breakaway feature shall conform to ConnDOT and AASHTO “Roadside Design Guide” and have adequate strength to carry the sign at 60 mile per hour wind loadings.
- B. Tubular Post
 - 1. 2.5-inch steel pipe, 3.12 lb/lf, cold formed and welded, ASTM A1011/A1011M, minimum yield strength of 50,000 psi. External surface triple coated per ASTM F1043, Type B & Type D with a minimum of 0.9 ounces of zinc per square foot, a minimum of 15 micrograms of chromate per square inch and high performance polymer top coating with a zinc-rich exterior thickness of not less than 0.3 mils. Internal coating shall be Type B, zinc 0.90 ounces per square foot minimum, or type D, zinc-pigmented, 81% nominal coating with 0.3 mils minimum thickness.
 - 2. Cap: Pressed steel dome, galvanized, ASTM F1043 sized to fit post.

2.7 FASTENERS AND ANCHORS

- A. Sign fabricator shall design a complete system of fastenings and anchorage devices for the various signs, as required for attachment to the various supporting structures. These may include, but are not limited to, nuts, bolts, clip systems, face screws, epoxy adhesives, etc. Wherever reasonably possible, fastenings and anchorage devices shall be fully concealed and shall be vandal proof. Contractor is responsible to provide safe and secure installations in strict conformance to the governing laws and building code.
- B. Fully describe proposed fastenings and anchorage devices for each sign type on the shop drawings.
- C. Bolts: Stainless Steel, Hex head, integral flange, ASTM A354.
 - 1. 5/16 Inch -18 UNC x 1.75 inch, Grade BC for 3.00 pounds/lf U-channel posts.
 - 2. 5/16 Inch -18 UNC x 2.00 inch, Grade BD for 4.00 pounds/lf U-channel posts.
 - 3. 5/16 Inch -18 UNC x 3.00 inch, Grade BC with vandal-resistant head for tubular posts.

- D. Nuts: Stainless Steel, hex head, integral flange, ASTM A563.
 - 1. 5/16 Inch -18 UNC, Grade DH.
- E. Lockwashers: Stainless steel, split helical spring.
 - 1. 3/8 inch, heavy duty external type.
- F. Polyvinyl chloride (PVC) conduit: ASTM D2729, Schedule 40 or Schedule 80.
- G. Cold Patch: commercially-available polymer-modified asphalt and stone mixture designed for use at ambient temperatures.
- H. Concrete: Portland cement concrete, ASTM C94 with a maximum 3/4" aggregate and having a minimum compressive strength of 3,000 psi at 28 days.

PART 3 EXECUTION

3.1 GENERAL

- A. Signs shall be installed in accordance with approved manufacturer's instructions at locations shown on the Drawings.

3.2 REMOVAL OF SIGNS

- A. Remove signs, including sign, supports and associated appurtenances, as indicated on the Drawings or as called for in the Specifications.
 - 1. Post shall be removed from the ground, unless the cutting of posts at ground-level is specifically approved by the Engineer in writing.
- B. All materials resulting from sign removal shall be removed from the Project Site by Contractor for disposal, reuse, salvage or recycling in accordance with applicable regulations.

3.3 PROTECTION AND TEMPORARY COVERS

- A. Completed sign panels shall be properly protected and maintained in good condition, free from dirt, scratches, hand marks or other blemishes. The panels shall be shipped in such a manner as to insure their arrival on the job site in an undamaged condition.
- B. Subsequent to erection, if directed by Engineer, exterior signs may be required to be covered until the actual use thereof is desired. Material used to temporarily cover any sign panel shall effectively conceal the message and be non-injurious to the panel, its finish, or its structural integrity.

3.4 INSTALLATION

- A. Erection of all work under this Section shall be performed by experienced sign erectors. Signs shall be installed true, plumb, and level, located as shown on the Drawings. No field cutting of any sign work will be allowed. Exercise extreme care in all handling and stacking of signs to avoid chipping. Exact location of signs will be determined by Engineer in the field.
- B. All work shall be rigidly anchored to the supporting construction, as indicated on the approved shop drawings.

3.5 ALUMINUM SIGN PANEL

- A. Sign panels shall show careful workmanship and present a reasonably plane surface with the message and outlines clear and sharp.
 - 1. Finished sign panels shall be shipped in such manner as to ensure arrival on the Project in undamaged condition, where they shall be properly protected from dirt, scratches, hand-marks and other blemishes until erected and accepted.
- B. Reflective sheeting shall be applied to properly treated base panels with mechanical equipment in a manner specified for the manufacture of traffic control signs by the sheeting manufacturer. Heat activated adhesive coating sheeting shall be pre-perforated.
 - 1. No splices shall be allowed on sign panels.
- C. When pressure sensitive adhesive coating reflective sheeting is used all sheeting splices and sign edges shall be sealed with materials recommended by and in a manner specified by the sheeting manufacturer.
 - 1. Dry heat activated adhesive coated reflective sheeting when applied to aluminum shall be edge sealed as specified by the sheeting manufacturer.

3.6 REFLECTIVE SHEETING

- A. Reflective sheeting shall be applied to properly treated base panels with mechanical equipment in a manner specified by the sheeting manufacturer.
- B. Numerals shall be black-die-cut, pre-spaced, conforming to the details on the Contract Drawings and/or Engineer standards. Numerals shall have a pre-coated, pressure-activated adhesive applied as recommended by the manufacturer of the reflective sheeting or be opaque black permanent inks applied on approved high intensity sheeting.
- C. Treatment of Aluminum Sign Panels Prior to Application of Reflective Sheeting.
 - 1. Vapor degreasing: By total immersion of the panel in a saturated vapor or trichloroethylene. Trademark printing shall be removed with lacquer thinner or controlled alkaline cleaning system.
 - 2. Alkaline degreasing: By total immersion of the panel in a tank containing alkaline solutions, controlled and titrated to the solution manufacturer's specification.
 - 3. Rinsing: After satisfactory degreasing, the panels shall be thoroughly washed with running water.
 - 4. Drying: The panel shall be thoroughly dried by use of a forced hot air dryer.
 - 5. Metal shall not be handled between cleaning and etching operation and the application of reflective sheeting, except with devices or clean canvas gloves.
 - 6. Metal shall not come in contact with greases, oils, or other contaminants prior to the application of reflective sheeting.

3.7 CLEAN-UP

- A. Surfaces of sign work shall be cleaned as recommended by the sign manufacturer after installation and left in a condition satisfactory to Engineer.

- B. All defective work, including that exhibiting cracked, chipped, scratched, abraded, or otherwise damaged finishes, shall be removed and replaced with work conforming to the specified requirements.

3.8 ERECTION OF POSTS

- A. Posts shall be installed in conformance with details shown on the Drawings or as otherwise required by the State of Connecticut or Local Traffic Authority.
- B. Posts shall be driven a minimum of three (3) feet into firm ground or shall be anchored in concrete in accordance with Engineer requirements.
- C. Bottom of all signs shall be the minimum height above existing ground in accordance with the Drawings, State of Connecticut, MUTCD, or the Local Traffic Authority.

END OF SECTION

SECTION 31 2319 - DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removal of surface water and ground water as necessary to perform the construction required by the contract.
2. Constructing, installing, building, and maintaining all necessary temporary water extraction and management facilities.
3. Furnishing, installing, and operating all necessary pumps, piping, and other equipment.
4. Complying with all applicable approvals, authorizations or permits associated with the management of dewatering wastewaters.
5. Removing all such temporary works and equipment after their intended function is no longer required.

B. Contractor shall coordinate work between all Subcontractors, sections, and trades required for the proper completion of the work.

C. Contractor is responsible for all health and safety.

1.2 REFERENCES

A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.

B. Code of Federal Regulations (CFR)

1. 29 CFR 1926, Safety and Health Regulations for Construction.

C. Connecticut Department of Energy and Environmental Protection (DEEP)

1. Connecticut Guidelines for Soil Erosion and Sediment Control, DEP Bulletin 34, State of Connecticut Council on Soil and Water Conservation, 2002.
2. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities, (DEP-PED-GP-015), latest issue.
3. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Groundwater Remediation Wastewater to a Sanitary Sewer (DEP-PERD-GP-007), latest issue.
4. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water (DEP-PED-GP-020), latest issue.

- D. Regulations of Connecticut State Agencies (RCSA)
 - 1. RCSA Section 22a-372-1, 22a-377(b)-1, 22a-377(c)-1, 22a-377(c)-2, Water Diversion.
 - 2. RCSA Section 22a-430-3 through 4, General Conditions Applicable to Water Discharge Permits and Procedures and Criteria for Issuing Water Discharge Permits.
 - 3. RCSA Section 22a-430-8, Underground Injection Control.

1.3 DESCRIPTION OF THE WORK

- A. Prevent surface water and subsurface or groundwater from flowing into excavations or earthwork areas which would cause flooding of the Project Site and surrounding area, or softening or loosening of the soil at excavation or earthwork subgrade.
- B. Provide adequate and satisfactory dewatering and drainage of excavations and furnish all materials and equipment and do all incidental work required in conjunction with the furnishing, installing, and maintaining of same to permit proper and timely completion of all work required.
- C. Contractor may choose any satisfactory dewatering method he wishes subject to the approval of Engineer, provided such method performs the dewatering required and complies with applicable approvals, authorizations and permits.
- D. Contractor shall assume all responsibility for the adequacy of the methods, materials, and equipment employed. Contractor shall take all precautions necessary to prevent loosening or softening of the subgrade. In this regard, Contractor shall at all times be prepared to alter his construction method or sequence.
- E. The work shall be maintained dry until the structures (building slabs and footings, paved area, pipe, drainage structure, embankments, etc.) are completed.
- F. All dewatering required by pumping and drainage shall be performed without damage to the excavation, pipe trench, pavements, pipes, electrical conduits, other utilities and any other work or property. Existing or new sanitary sewers shall not be used to dispose of drainage.

1.4 SUBMITTALS

- A. Dewatering Plan: Prior to installation of the dewatering system, submit design data showing the following, for review by Engineer:
 - 1. Locations and associated construction where dewatering is required.
 - 2. Specific methods and devices proposed for dewatering.
 - 3. Details on protection at the inlet and outlet of pumps, method for floating the pump intake, or other methods to minimize and retain the sediment.
 - 4. Proposed location of dewatering discharge and details of infiltration basins or other discharge location. Per the General Permit, where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground.
 - 5. Details on any containment berm construction when dewatering earth materials.

6. Identification of a contingency plan for emergency operations should the dewatering operation prove inadequate to meet the dewatering need or is found to be causing unacceptable turbidity problems (e.g., alternative discharge locations or use of a portable sediment tank). If turbidity or siltation problems are not adequately controlled by the contingency plan, then the operation will be ceased and a revised dewatering plan submitted for approval prior to further implementation.

1.5 REGULATORY COMPLIANCE

A. Comply at all times with the following as applicable to the Project:

1. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities, (DEP-PED-GP-015), latest revision. Conditions of such permit, other conditions of approval or authorizations, and any Stormwater Pollution Prevention Plans shall become part of the Contract Documents.
2. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Groundwater Remediation Wastewater to a Sanitary Sewer (DEP-PERD-GP-007), latest revision. The conditions of such permit, other conditions of approval or authorizations, and any supplemental plans shall become part of the Contract Documents.
3. Connecticut Department of Energy and Environmental Protection General Permit for the Discharge of Groundwater Remediation Wastewater Directly to Surface Water (DEP-PED-GP-020), latest revision. The conditions of such permit, other conditions of approval or authorizations, and any supplemental plans shall become part of the Contract Documents.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 JOB CONDITIONS

- A. Surface Drainage: Intercept and divert precipitation, and surface water, away from excavations through the use of temporary diversion swales, temporary sediment traps, pipes, sumps or other approved means.
- B. Drainage of Excavated Areas: Provide and maintain ditches of adequate size to collect surface and seepage water, which may enter the excavations. Divert the water into sumps and storm drains or pump into drainage channels or storm drains. When water is to be diverted into a storm drain, provide dewatering settling basins, or other accepted apparatus, such as fractionation tanks, as required to reduce the amount of fine particles, which may be carried into the drain. If a storm drain becomes blocked due to dewatering operation, it shall be cleaned by the Contractor at his own expense.

3.2 DEWATERING

- A. Where feasible and appropriate, dewatering wastewaters will be infiltrated into the ground. Dewatering wastewaters discharged to surface waters will be discharged in a manner that minimizes the discoloration of the receiving waters. The following measures will be

employed to ensure that dewatering wastewaters will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution:

- B. Divert surface waters away from areas needing dewatering.
- C. Consider if well points and sumps can be used to lower the groundwater table reducing the need for settling facilities.
- D. For sites that don't require continuous pumping, pump work areas before construction activities begin each work day.
- E. Provide filtration near the suction intake.
- F. Locate pumps, intake sumps, and other intake structures in areas which will not require constant moving, when possible.
- G. Locate pump discharge facilities (portable, permanent, or bio-filtering structures) such that a minimum disturbance of existing wetlands and watercourses is incurred.
- H. Provide protection at outlets from pumping operations to dissipate pumping surges and prevent erosion at the point of discharge.
- I. Maintain the water level at such lowered elevations that no danger to structures can occur because of the buildup of excessive hydrostatic pressure on the subgrade, or bottom of trench, unless otherwise permitted by Engineer.
- J. Do not allow water to accumulate in excavations. At all times during construction, provide ample means and devices with which to remove promptly and dispose properly of all water entering roadway, trench, and structure excavations and keep them dry until the structures to be built thereon are completed.
- K. No pipe/culvert/structure shall be laid in water. No masonry shall be laid in water, and no water shall be allowed to rise over masonry (either concrete or brick) in 24 hours after being placed. Nor shall moving water be allowed to rise over masonry for four days. In no event shall water be allowed to rise so as to set up unequal pressures in the structures until the concrete or mortar has set at least 24 hours. The Contractor shall constantly guard against the possibility of flotation of pipe or structures after installation. He shall place adequate backfill promptly in accordance with Section 31 2310 - Earthwork to prevent this occurrence, and his method of handling drainage and carrying on these operations shall always be adequate to prevent flotation.

END OF SECTION

SECTION 314143 -SHEETING AND STAYBRACING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Shoring and bracing necessary to protect existing buildings, existing culvert, streets, walkways, utilities, and other improvements and excavation against loss or ground caving embankments.
2. Maintenance of shoring and bracing.
3. Removal of shoring and racing, as required.

1.2 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. State of Connecticut Department of Transportation (ConnDOT)
 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 and any supplements.
- C. Code of Federal Regulations (CFR)
 1. 29 CFR 1926, Safety and Health Regulations for Construction.

1.3 DESCRIPTION OF THE WORK

- A. Contractor shall install sheeting or staybracing as necessary in order to comply with the Applicable Safety Code; to accommodate traffic; to permit access to existing utilities; to provide an opening of proper depth and width in which to install the proposed pipes and other underground structures; and to protect his workmen, employees of the Owner and (Insert Name), State and the public, from death or injury from bank failure, earth collapse or earth movement of any nature whatsoever. In general, all trenches and excavations over 5 feet in depth, any other unstable excavations or excavations in unstable material, shall be protected against the hazard of collapse.

1.4 SHEETING/STAYBRACING DESIGN

- A. Contractor shall be entirely and solely responsible for the adequacy and sufficiency of all supports and for all sheeting, bracing, shoring, underpinning, cofferdamming, etc. The Contractor shall assume the entire and sole responsibility for damages on account of injury to persons or damage to adjacent pavements and public and private property (including but not limited to, the Work under construction, existing buildings, facilities, etc.) which injury or damage results directly from said Contractor's failure to install, or to leave in place, adequate and sufficient supports, sheeting, bracing, underpinning, cofferdamming, etc.
- B. Contractor shall submit, in triplicate, a detailed written description of the equipment and sheeting methods he proposes to use to Engineer prior to the installation of any sheeting

and/or shoring. These plans should include, but not be limited to, the type of sheeting or shoring, sizes and dimensions, bracing, spacing, methods of installation and removal, etc.

- C. All sheeting shall be designed and sealed by a Professional Engineer licensed to practice in the State where the Work is being performed. He shall be known as the Contractor's Engineer. Sheeting computations and sketches shall be submitted for Engineer's review.

1.5 SHEETING LEFT-IN-PLACE

- A. Sheeting, shoring or other timbering may be left-in-place at the option of the Contractor when needed to protect other existing facilities or the Work built or to be built under this Contract. However, steel sheeting left-in-place will be paid for only where specifically shown as "Steel Sheeting Left-in-Place" on the Contract Drawings or where ordered by Engineer.
- B. It is expressly understood and agreed that removing or leaving-in-place any sheeting or shoring, etc., as noted above, shall not relieve the Contractor from any responsibility for any loss damage whatever due to omission of, or failure of, the sheeting, etc., failure to leave it in place, or the settling of the backfill, or any movement of the ground or any structure or object adjacent to any trench or excavation made by Contractor. Engineer will not order sheeting left-in-place at the expense of the Owner in order to accommodate the convenience of the Contractor or to save him the cost of its removal.

1.6 OPTIONAL METHOD OF TRENCHING

- A. Contractor may, with the approval of Engineer, lay back slopes in accordance with the provisions of the Applicable Safety Code in order to avoid the necessity of sheeting or limiting the quantity thereof. However, in the case of trenches, the toe of this slope will not be lower than one foot above the top of the pipe to be installed. A level bench of at least two (2) feet in width shall be maintained between the toe of the sloped section and vertical trench excavation for pipes with an outside diameter of six (6) feet or less; for pipes with an outside diameter over six (6) feet, a minimum four (4) foot bench shall be provided. Where sloping is used as a substitute for sheeting or staybracing, or used in combination therewith, it shall be sloped a minimum of one horizontal to one vertical except where instability of the material requires a slope flatter than one to one. If the Contractor elects and is allowed to lay back the slopes, there will be no additional payment made for the extra excavation outside of the normal trench or structure excavation payment limits.

1.7 RESPONSIBILITY OF ENGINEER

- A. There shall be no obligation on the part of Engineer to issue orders for sheeting, staybracing or sheeting left-in-place and/or to pass upon sufficiency and adequacy of sheeting; nor shall the failure on the part of Engineer to give such orders relieve the Contractor from liability for damages occasioned by negligence, or otherwise growing out of the Contractor's failure to either install sufficient and adequate sheeting and/or staybracing or to leave in place in the excavation sufficient and adequate support to prevent the caving in or moving of the ground adjacent to the sides of the excavation during and after the backfilling operation.

PART 2 PRODUCTS

2.1 WOOD STAYBRACING

- A. Wood Staybracing

2.2 STEEL SHEETING

- A. Steel sheeting: continuous and interlocking sheets, ASTM A-328.

2.3 TRENCH BOXES

- A. Trench boxes shall not be used unless requested by the Contractor and authorized by Engineer. If authorized, they shall be used only when the protection of workmen is involved, not for support of existing adjacent utilities, structures, embankments, etc. A trench protected by the use of a trench box shall not be considered a sheeted trench.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Unless expressly authorized by Engineer, sheeting shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting to facilitate driving, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside of the sheeting.
- B. All sheeting and staybracing shall be securely installed and properly braced in accordance with the Applicable Safety Code. Engineer may direct the Contractor at any time in writing to have sheeting, bracing, etc. in place to be embedded in backfill or concrete for the purpose of preventing subsequent injury to structures and property.
- C. The depth of pilot cuts for trenches/structures shall not exceed five (5) feet in depth at any time. Engineer may reduce the depth of the pilot cut should the soil and subsurface conditions warrant such action. Sheeting must be driven by drop hammer or other methods approved in writing by Engineer below the area of the pilot cut. Driving of sheeting above the pilot cut is subject to the directions of Engineer. Engineer may direct the Contractor to use other types of equipment, and to revise the procedure during the excavation of the pilot cut and the driving of the sheeting should it be found necessary to do so.
- D. Vibratory driving hammers shall not be used unless specifically authorized by Engineer.
- E. Where sheeting is specified to be left-in-place, it shall be wood sheeting unless otherwise specifically noted on the Contract Drawings. Where wooden sheeting cannot be driven due to the nature of the material, then steel sheeting may be driven and removed in lieu of the wooden sheeting providing the following procedures are followed:
 - 1. Simultaneously with the withdrawal of sheeting and as each layer is compacted in accordance with Section 312310 - Earthwork; or
 - 2. The trench/area will be backfilled to the surface. If the sheeting is to be withdrawn, backfilling will proceed up to each set of rangers and braces; the rangers and braces will be removed; the backfilling will proceed up to the next set of rangers and braces, etc. up to the top of the excavation. The backfill material shall be compacted to 98% of the maximum dry density as determined by AASHTO T 99, Method C. Alternate sections of sheeting from the left side and right side of the trench/area shall be removed and the cavity remaining there from shall be jetted thoroughly by high-pressure water, starting at the toe of the sheeting and being drawn to the surface. Sand shall be inserted with the jetting process.
 - 3. Where the bottom of the excavation is not free draining material (some areas of organic material or miscellaneous fill) or where granular backfill is not available or ordered by Engineer, the jetting shall be very carefully done with a minimum amount

of water being expended. In such locations, the Contractor may request the approval of Engineer for other compaction methods in the sheeting cavity.

4. Contractor shall remove the sheeting and/or staybracing from the excavation, except where it is specifically indicated on the Contract Drawings "To be Left- in-Place", or the Contractor may elect to leave in place the sheeting and/or staybracing for his own convenience, or to serve his own interest to protect existing facilities, the Work built or to be built under this Contract, or for the safety of the public, etc., at no cost to the Owner. No sheeting or bracing which is within three feet of the existing or proposed finished grade may be left-in-place without the prior permission of Engineer. This may require the Contractor cut off sheeting at this elevation and at no additional cost to the Owner.
5. Where sheeting, regardless of the type of sheeting used, is left in place, as specified or ordered or at the Contractor's convenience/option, unless otherwise specifically permitted in writing by Engineer, all elements such as rangers, braces, wales, etc. shall be left in place except as specified hereinbefore; and, except such temporary braces required to be removed to make way for the structure/utility. Where it is necessary to remove such temporary braces, the sheeting shall be rebraced, but in no case shall the sheeting be braced against the sides of the structure/utility to be constructed unless approved in writing by the owner of the structure/utility. Where lagging and "soldier" beams are used, the "soldier" beams and all the braces shall also be left in place.
6. Where wood sheeting has been driven below the excavation bottom to provide for a "toe-in", no wood sheeting below the top of pipe or structure shall be removed, but it shall be cut off at this elevation and the remaining sheeting above this line removed as described herein. There will be no payment made for this work, nor for the wood sheeting left-in-place.
7. Sheeting shall be cut away and removed from in front of capped outlets or other braces or inlets set in the pipe for future connections.
8. All sheeting, shoring and bracing removed shall be carefully removed from the excavation in such a manner as not to endanger the completed work or any adjacent pavements, buildings, structures, utilities, property, etc. The sheeting shall be withdrawn to such an extent that it is just above the backfill material being compacted and all voids left or caused by the withdrawal of such sheeting, shall be immediately refilled with approved material and compacted at no additional cost to the Owner.
9. Where the excavation is to be left open during non-working hours, the sheeting shall extend 42 inches above existing grade to protect pedestrian and vehicular traffic from the open excavation.

END OF SECTION

SECTION 32 1216 - BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. The work under this section consists of the production and placement of a smooth and dense bituminous concrete mixture with a uniform texture for a completed base course, the surface of an existing pavement or the surface of an existing pavement which has been brought to proper grade and cross section.
- B. Section includes:
 - 1. Asphaltic (Bituminous) concrete paving for street, driveway and parking areas.
 - 2. Installation of bituminous concrete overlays over existing pavement, including surface preparation, truing and leveling pavement, tack coating and all other associated items and operations necessary and required to complete the installation.
 - 3. Adjustment of existing castings to finished grade.
 - 4. Saw cutting existing edge of pavements for the construction of a proper pavement butt.

1.2 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR).
 - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. State of Connecticut Department of Transportation (ConnDOT).
 - 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 and any supplements.
- D. American Association of State High and Transportation Officials (AASHTO).
 - 1. AASHTO M-17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
 - 2. AASHTO M 82, Cutback Asphalt (Medium-Curing Type) .
 - 3. AASHTO M-208 - Standard Method of Test for Unconfined Compressive Strength of Cohesive Soil-ASTM Designation D 2166.
 - 4. AASHTO M-320 - Standard Specification for Performance-Graded Asphalt Binder.
 - 5. AASHTO R-26 - Standard Recommended Practice for Certifying Suppliers of Performance-Graded Asphalt Binders.
 - 6. AASHTO R-29 - Standard Practice for Grading or Verifying the Performance Grade of an Asphalt Binder.
 - 7. AASHTO T-27 - Sieve Analysis of Fine and Course Aggregates.

8. AASHTO T-84 - Specific Gravity and Absorption of Fine Aggregates.
 9. AASHTO T-85 - Specific Gravity and Absorption of Coarse Aggregates.
 10. AASHTO T-96 - Standard Method of Test for Resistance to Degradation of small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 11. AASHTO T 104 Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate.
 12. AASHTO T-209 - Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 13. AASHTO T-245 - Standard Method of Test for Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus.
 - E. MS-2: Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types - The Asphalt Institute (AI).
 - F. Hot Mix Asphalt Paving Handbook 2000 - U.S. Army Corps of Engineers, UN-13 (CE MP-ET)
 - G. M-19: Basic Asphalt Emulsion Manual - The Asphaltic Institute (AI).
- 1.3 American Society for Testing and Materials (ASTM)
- A. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.
 - B. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
- 1.4 JOB CONDITIONS
- A. Weather Limitations
 1. The bituminous concrete mixture shall not be placed whenever the surface is wet or frozen or when the temperature is outside the limitations stated in Table 1 below unless the contractor has a Cold Weather Paving procedure approved by Engineer. Contractor shall be responsible for submitting the procedure at least one week in advance of any paving operations that may result in placement of the bituminous concrete pavement outside of the temperature limitations stated in the following:

Table 1
Temperature Limitations for Placement of Bituminous Concrete Pavement (ConnDOT 4.06.03 (4))

Lift thickness (Inches)	Minimum Air and Surface Temperature (Degrees F)	
	Final Course	All Other Courses
Less than 1- 1/2 inch	50	50
1-1/2 to 2-1/2 in	40	40
Over 2-1/2 in.	40	32

2. Apply tack coat where indicated on the drawings and when ambient temperature is above 40°F, and when temperature has been above 35°F for 12 hours immediately prior to application. Do not apply when base is wet, contains excess moisture, or during rain.

1.5 SUBMITTALS

- A. Request for approval of all material sources of supply.
- B. Material Safety Data Sheet (MSDS) for each grade of binder.
- C. Design Mix: Before any bituminous concrete paving is constructed, submit actual design mix to Engineer for review and/or approval. Design mix submittal shall follow the format as indicated in the Asphalt Institute Manual MS-2, Marshall Stability Method; and shall include the type/name of the mix, gradation analysis, grade of asphalt cement used, Marshall Stability (lbs.), flow, and effective asphalt content (percent).
- D. Material Certificates: Submit Material Certificate to Engineer, which is signed by material producer and Contractor, certifying that materials comply with, or exceed, the requirements herein.

1.6 COORDINATION

- A. Contractor shall coordinate with all other trades, especially underground Utility Contractors, in order to prevent covering up unfinished or uninspected work and loss of time or labor by improper scheduling. Any rework shall be done at no cost to the Owner.

1.7 SUBGRADE TESTING

- A. Subgrade bearing capacity shall be determined by testing. The minimum CBR (California Bearing Ratio) shall be 10. The Contractor shall perform CBR tests as necessary, but in no case less than one test for each 1,000 square yards of paved area.
- B. Contractor shall remove any subgrade areas not meeting the minimum CBR during subgrade preparation. Areas of subgrade removal shall be filled and compacted with suitable material at no extra cost to Owner.

1.8 EQUIPMENT

- A. Contractor shall have the paving and compaction equipment at the Project site in a sufficient amount of time before operations so that it can be inspected and approved by Engineer. The Contractor shall repair or replace any equipment found worn or defective, either before or during paving, to the satisfaction of Engineer.
- B. Pavers: Each paver shall have a receiving hopper with sufficient capacity to provide for a uniform spreading operation and a distribution system that places the mix uniformly, without segregation. The paver shall be equipped with a vibratory screed system with heaters or burners. The screed system shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Pavers with extendible screed units as part of the system shall have auger extensions and tunnel extenders as necessary. The screed unit shall have automatic screed controls for grade and slope unless otherwise approved by the Engineer. The controls shall automatically adjust the screed to compensate for irregularities in the preceding course or existing base. The controls shall maintain the proper transverse slope and be readily adjustable, and shall operate from a fixed or moving reference such as a grade wire or floating beam.

- C. Rollers: All rollers shall be self-propelled and designed for compaction of bituminous concrete.
 - 1. Non-vibratory (static) rollers shall be steel wheel types. These rollers may also be of the type that can be used as vibratory rollers.
 - 2. Pneumatic tire rollers shall be self-propelled and equipped with wide-tread compaction tires capable of exerting an average contact pressure from 60 to 90 pounds per square inch uniformly over the surface, adjusting ballast and tire inflation pressure as required. The Contractor shall furnish evidence regarding tire size; pressure and loading to confirm that the proper contact pressure is being developed and that the loading and contact pressure are uniform for all wheels.
 - 3. Vibratory rollers shall be equipped with indicators that provide the operator with amplitude, frequency and speed settings/readouts to measure the impacts per foot during the compaction process.

PART 2 PRODUCTS

2.1 GENERAL

- A. All sources of materials used for the production of bituminous concrete materials must be approved by Engineer prior to their use. Such materials shall include coarse aggregate, fine aggregate, mineral filler and designated bitumen combined to meet the composition limits by weight (mass) and other requirements stated in Table 2.
- B. An adequate quantity of each size aggregate, mineral filler and bitumen shall be maintained at the bituminous concrete plant site at all times while the plant is in operation to ensure that the plant can consistently produce bituminous concrete materials that meet the job mix formula (JMF) as specified in Article 2.5. The quantity of such material shall be approved by Engineer on an individual plant basis and is dependent upon the plant's daily production capacity, but shall never be less than one day's production capacity.

2.2 MINERAL AGGREGATE

- A. Coarse Aggregate
 - 1. Coarse aggregate shall consist of clean, hard, tough, durable fragments of crushed stone or crushed gravel of uniform quality. Aggregates from multiple sources of supply shall not be mixed or stored in the same stockpile.
 - 2. Basis of Acceptance: The request for approval of the source of supply shall include a washed sieve analysis in accordance with AASHTO T-27. The apparent specific gravity (Gsa), bulk specific gravity (Gsb) and percent absorption (Paw) shall be determined in accordance with AASHTO T-85. The aggregate shall not contain more than 1% crusher dust, sand, soft disintegrated pieces, mud, dirt, organic and other injurious materials. When tested for abrasion using AASHTO T-96, the aggregate loss shall not exceed 40.0%. When tested for soundness using AASHTO T-104 with a magnesium sulfate solution, the coarse aggregate shall not have a loss exceeding 10.0% at the end of 5 cycles.
- B. Fine Aggregate
 - 1. Fine aggregate shall consist of clean, hard, tough, rough-surfaced and angular grains, of natural sand; manufactured sand prepared from washed stone screenings; stone

screenings, slag or gravel; or combinations thereof. Fine aggregates from multiple sources of supply shall not be mixed or stored in the same stockpile.

2. Basis of Acceptance: The request for approval of the source of supply must include the location, manufacturing and processing methods. The request for approval shall also include a washed sieve analysis in accordance with AASHTO T-27. Any fine aggregate component or final combined product shall have 100% passing the 3/8 inch (9.5 millimeter) sieve. The apparent specific gravity (G_{sa}), bulk specific gravity (G_{sb}) and percent absorption (P_{aw}) shall be determined in accordance with AASHTO T-84. The fine aggregates shall be free from injurious amounts of clay, loam, and other deleterious substances.

- C. The use of reclaimed asphalt pavement in new bituminous pavement is not permitted.

2.3 MINERAL FILLER

- A. Mineral filler shall consist of finely divided mineral matter such as rock dust, including limestone dust, slag dust, hydrated lime, hydraulic cement, or other approved mineral matter. At the time of use it shall be freely flowing and devoid of agglomerations.
- B. Basis of Acceptance: The request for approval of the source of supply shall include the location, manufacturing process, handling and storage methods for the material. Mineral filler shall conform to the requirements of AASHTO M-17.

2.4 LIQUID BITUMINOUS MATERIALS:

- A. Performance grade (PG) binder.
 1. Material shall have uniformly mixed and blended liquid bituminous materials that are free of contaminants such as fuel oils and other solvents. Such materials shall be properly heated and stored to prevent damage or separation. PG binders used in the production of bituminous materials shall be approved by Engineer. PG binders that are modified with fillers, extenders, reinforcing agents, adhesion promoters, additives, and thermoplastic polymers shall be approved for use only with the prior written approval from Engineer.
 2. Basis of Acceptance: The request for approval of the source of supply shall list the location where the materials will be produced, and manufacturing, processing, handling and storage methods along with necessary certification in accordance with AASHTO R-26. The PG binder utilized for the production of bituminous materials shall consist of the grade specified in the Contract when tested in accordance with AASHTO M-320 and AASHTO R-29.
- B. Cut-backs (medium cure type).
 1. The liquid petroleum materials for this item shall be produced by fluxing an asphalt base with appropriate petroleum distillates to produce the grade specified.
 2. Basis of Acceptance: The request for approval of the source of supply shall be submitted at least seven days prior to its use listing the location where the materials will be produced, and manufacturing, processing, handling and storage methods. The liquid asphalt shall be MC-250 conforming to AASHTO M-82.
- C. Emulsions

1. Emulsified asphalt shall be homogeneous and not be used if exposed to freezing temperatures.
2. Basis of Acceptance: The request for approval of the source of supply must include the location where the materials will be produced, and manufacturing, processing, handling and storage methods.
 - a. Emulsified asphalts shall conform to the requirements of AASHTO M-140. Materials used for tack coat shall be grade RS-1. When ambient temperatures are 80°F (27°C) and rising, grade SS-1 or SS-lh may be substituted if approved by Engineer.
 - b. Cationic emulsified asphalt shall conform to the requirements of AASHTO M-208. Materials used for tack coat shall be grade CRS-1. The settlement and demulsibility test will not be performed unless deemed necessary by the DRM. When ambient temperatures are 80°F (27°C) and rising, grade CSS-1 or CSS-lh may be substituted if approved by Engineer.

2.5 MIX DESIGN AND JOB MIX FORMULA (JMF)

A. Marshall Method - Class 1, 2, 3, 4 and 12

1. Requirements: The Marshall method shall be employed to develop a bituminous concrete mix design that includes a JMF consisting of target values for gradation and bitumen content for each class of bituminous concrete designated for the project in accordance with the latest Asphalt Institute's MS-2 manual. Each class of bituminous concrete must meet the requirements as shown in the Table 2.
2. Basis of Acceptance: The Contractor shall submit to the Engineer a request for approval of the JMF in accordance with one of the methods described in c, d, and e below. Prior to the start of any paving operations the JMF and production percentage of bitumen must be approved by the Engineer, and the Contractor must demonstrate the ability to meet the approved JMF and production percentage of bitumen for each class of material. Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.
3. **[Engineer will] [Contractor shall]** test each class of material for compliance with the submitted JMF and Table 2. The maximum theoretical density (Gmm) will be determined by AASHTO T-209 (modified). If the material does not meet the requirements, the JMF shall be adjusted within the ranges shown in Table 2 until an acceptable material is produced. All equipment, tests and computations shall conform to the Marshall method in accordance with AASHTO T-245 (modified).

Table 2
Ranges for Bituminous Concrete Hot Mix Asphalt Mixtures

Class	Class 1	Class 2	Class 3	Class 4	Class 12
Grade of PG Binder	PG 64-22	PG 64-22	PG 64-22	PG 64-22	PG 64-22
Content (%)	5.0-6.5	5.0-8.0	6.5-9.0	4.0-6.0	7.5-10.0
Sieve Size	Percent Passing (%):				
2"	--	--	--	100	--
1"	100	--	--	--	--
¾"	90-100	--	--	60-80	--
½"	70-100	100	100	--	100

3/8"	60-82	90-100	95-100	42-66	98-100
1/4:	--	--	--	--	--
No. 4	40-65	55-80	65-87	30-55	80-95
No. 8	28-50	40-64	40-70	20-40	60-95
No. 30	10-32	16-36	20-40	--	20-60
No. 50	6-26	8-26	10-30	5-18	10-40
No. 200	3-8	3-8	3-8	0-5	3-10
Additionally, the fraction of material retained between any two consecutive sieves shall not be less than 4%.					
Material Temperature:					
Degrees F (°F)	325 max.				
Aggregate (°F)	280-350				
Mixtures (°F)	265-325				275-325
Voids (%)	3.0-6.0	2.0-5.0	0-4.0	-	0-5.0
Stability (lbs min.)	1200	1000	1000	-	1000
Flow (inches)	0.08-0.15	0.08-0.15	0.08-0.18	-	0.08-0.15
VMA (%-min.)	15:16	-	-	-	-

4. An approved JMF from the previous operating season may be acceptable to the Engineer provided that there are no changes in the sources of supply for the coarse aggregate, fine aggregate, recycled material (if applicable) and the plant operation had been consistently producing acceptable material.
5. Contractor shall not change sources of supply after a JMF has been approved. Before a new source of supply for materials is used, a new JMF shall be submitted to the Engineer for approval.

B. Marshall mixture (virgin)

1. For Bituminous concrete materials that contain no recycled material, the limits prescribed in Table M.04.01 govern. Contractor shall submit to the Engineer for approval, a JMF with the individual fractions of the aggregate expressed as percentages of the total weight (mass) of the mix and the source(s) of all materials. The JMF shall indicate two bitumen contents; the JMF target percentage and a production percentage (actual amount added to mix) of bitumen for each mix class by total weight (mass). For surface course Class 1, a 0.45 power gradation chart shall also be submitted on which is plotted the percentage passing each sieve. The JMF shall also indicate the target temperature of completed mixture as it is dumped from the mixer.

2.6 BITUMINOUS CONCRETE BINDER COURSE

- A. ConnDOT Bituminous Class 1.

2.7 BITUMINOUS CONCRETE TOP/FINISH COURSE

- A. ConnDOT Bituminous Class 2.

2.8 BITUMINOUS CONCRETE CURBING

- A. ConnDOT Bituminous Class 3.

2.9 BITUMINOUS CONCRETE SIDEWALKS

- A. ConnDOT Bituminous Class 2.

2.10 EQUIPMENT

- A. Maintain equipment in satisfactory operating condition and correct breakdowns in a manner that will not delay or be detrimental to progress of paving operations.

PART 3 EXECUTION

3.1 GENERAL

- A. Contractor shall install all pavements as specified in the location and to the grades as shown on the Drawings and/or approved by Engineer. Materials, methods of construction, and type and thickness of pavement courses shall be as shown on the Details of the Drawings and as specified herein.
- B. Owner and its representatives shall have access to all parts of the Work under construction at all times.

3.2 PREPARATION FOR PAVEMENT INSTALLATION

- A. Remove loose material from compacted base material surface immediately before proofrolling.
- B. Proof roll prepared base material surface to check for areas requiring additional compaction and areas requiring removal and recompaction.
- C. Do not begin paving work until deficient base material areas have been corrected and are ready to receive paving.
- D. Check all frames, covers, grates, water valve boxes and other miscellaneous castings that are located in the proposed pavement areas to insure that all such items have been correctly positioned and set to the proper slope and elevation. All covers and grates are to be set flush with the required finished surface. No depressions or mounds will be permitted in the pavement to accommodate inaccuracies in the setting of these appurtenances. All correctional work that may be necessary, as determined by Engineer, shall be performed at the Contractor's expense.
- E. All vertical surfaces of structures and existing concrete surfaces in contact with new bituminous pavement shall be painted with a uniform coating of an approved bituminous emulsion material. Extreme care shall be exercised in the application of this material to prevent splattering or staining of surfaces that are to be exposed after the Work is completed. Surfaces that are stained as a result of the Contractor's operation shall be repaired and/or replaced to the satisfaction of Engineer at Contractor's expense.
- F. Bituminous paving shall not be applied until the Engineer inspects and approves the finished base.
- G. All existing paved surfaces to be overlayed must be thoroughly cleaned by a self-propelled sweeper. Areas inaccessible by power sweeper shall be broom swept until all non-pavement surface matter is removed.

3.3 TRANSPORT

- A. Mixture shall be transported from the mixing plant in trucks that have previously been cleaned of all foreign material and that have no gaps through which material might

inadvertently escape. The use of kerosene, gasoline, fuel oil, or similar products for the coating of the inside of truck bodies is prohibited. Truck body coating and cleansing agents must not have a deleterious effect on the transported materials. If such agents are applied, truck bodies shall be raised immediately prior to loading to remove any excess agent.

- B. Loaded trucks shall be tightly covered with waterproof covers acceptable to the Engineer. Mesh covers are prohibited. The front and rear of the cover must be fastened to minimize air infiltration.
- C. Do not exceed legal weight limits.

3.4 APPLICATION

A. Tack Coat

- 1. Apply to contact surfaces of all portland cement concrete surfaces and surfaces abutting or projecting into bituminous concrete pavement.
- 2. Apply tack coat to existing bituminous concrete surfaces at match points and where indicated on the drawings.
- 3. Apply at a minimum rate of 0.05 gallons per square yard of surface.
- 4. Allow to dry until at proper condition to receive paving.

3.5 PLACING AND COMPACTING

- A. Prior to the placement of the bituminous concrete, the underlying base course shall be brought to the plan grade and cross section within the allowable tolerance. Immediately before placing the mixture, the area to be surfaced shall be cleaned by brooming or by other means acceptable to the Engineer. Place bituminous concrete mixture on completed, compacted base surface, spread, and strike off.
- B. Whenever possible, all pavement shall be spread by a self-propelled finishing machine. At inaccessible or irregular areas, pavement may be placed by hand methods. The hot mixture shall be spread uniformly to the required depth with hot shovels and rakes. After spreading, the hot mixture shall be carefully smoothed to remove all segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be of the type designed for use on asphalt mixtures. Loads shall not be dumped faster than they can be properly spread. Workers shall not stand on the loose mixture while spreading.
- C. Paving Machine Placement: Apply successive lifts of bituminous concrete in transverse directions with the surface course placed in the direction of surface-water flow. Place in typical strips not less than 10'-0" wide.
- D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construction joints shall have the same texture, density, and smoothness as other sections of bituminous concrete courses. Clean contact surfaces and apply tack coat.
- E. The mixtures shall be placed and compacted to provide a smooth and dense surface with a uniform texture. When overtaken by sudden storms, the Engineer may permit placement of the bituminous concrete to continue up to the quantity of material that is in transit from the plant.

- F. The mixture shall be placed at a temperature that is within 25°F of the approved job mix formula.
- G. Before rolling is started, the mat shall be checked for defects in material or placement. Such defects shall be corrected to the satisfaction of the Engineer. Where it is impracticable due to physical limitations to operate the paving equipment, the Engineer may permit the use of other methods or equipment. Where hand spreading is permitted, the mixture shall be placed by means of suitable shovels and other tools, and in a uniformly loose layer at a depth that will result in a completed pavement having the designed depth. Any deviation from standard crown or section shall be immediately remedied by placing additional material or removing surplus as directed by the Engineer. The Engineer may direct that other means of spreading be used to ensure a better control of the depths of material and the finished surface.
- H. A thin uniform coating of tack coat shall be applied to the pavement immediately before overlaying and be allowed sufficient time to break (set). All surfaces that have been in place longer than five calendar days shall have an application of tack coat. A tack coat shall be applied to all contact surfaces such as gutters, manholes and concrete barriers. The tack coat shall be applied by a non-gravity pressurized spray system that results in uniform overlapping coverage at an application rate of 0.05 to 0.15 gallons per square yard. Gravity-fed systems are not acceptable for tack coat application. The Engineer must approve the equipment and the method of measurement prior to use. The material for tack coat shall not be heated in excess of 160°F and shall not be further diluted.
- I. Refueling of equipment is prohibited in any location on the paving project where fuel might come in contact with bituminous concrete mixtures already placed or to be placed. Solvents for use in cleaning mechanical equipment or hand tools shall be stored clear of areas paved or to be paved. Before any such equipment and tools are cleaned, they shall be moved off the paved or to-be-paved area; and they shall not be returned for use until after they have been allowed to dry.
- J. Immediately before placing bituminous concrete on a waterproofing membrane, the membrane shall be swept clean. If the membrane is damaged it shall be repaired by patching as directed by the Engineer.
- K. Temporary and permanent transverse joints shall be formed by saw-cutting a sufficient distance back from the previous run, existing bituminous concrete pavement, or bituminous concrete driveways to expose the full depth of the course. On any cold joint, immediately prior to additional bituminous concrete materials being placed, a brush of tack coat shall be used on all contact surfaces.
- L. The longitudinal joint shall be offset at least six inches from the joint in the course immediately below. The joint in the final surface shall be at the centerline or at lane lines.

3.6 ROLLING AND COMPACTION

- A. In general, rolling shall consist of initial or breakdown rolling, intermediate rolling and final or finish rolling. The contractor shall furnish a sufficient number and type(s) of rollers for each paving machine to properly compact the mat. When operating the roller in the vibratory (dynamic) mode, the operator shall maintain a minimum of ten to twelve impacts per foot. All vibratory rollers shall be shut off from the vibrating mode when reversing directions and be equipped with automatic reversing eccentrics (weights). The use of a vibratory roller in the dynamic or vibratory mode is prohibited on concrete structures such as bridges and catch basins.

- B. If the Engineer determines that the use of vibratory compaction equipment may damage highway components, utilities or adjacent property, the Contractor shall provide alternate compaction equipment to meet specification requirements unless otherwise approved by the Engineer. The completed pavement course on roadways and bridges will have the mat and longitudinal joints tested for compaction in accordance with the "Density Testing Procedure" established by the Department's Director of Research and Materials. Each course placed at a depth of one and one-half inches or greater shall have the mat and longitudinal joints compacted to a minimum of 92.0 percent and no more than 97.0 percent density as determined by AASHTO T209 (modified). Class 4 bituminous concrete is excluded from the joint density requirements.
- C. Surface Tolerance: The Contractor shall perform random spot-checks with a contractor-supplied ten-foot straightedge placed parallel to the centerline of the road to verify surface tolerances. The final surface course will not vary more than 1/4 inch from a ten-foot straightedge and 3/8 inch for all other courses. Such tolerance will apply to all paved areas including bridge approaches, headers, and existing pavement. Any irregularity of the surface exceeding these limits shall be corrected.
- D. Protection of the Work: All sections of the newly finished pavement shall be protected by the Contractor from damage by the Contractor's equipment and traffic.
- E. Corrective Work Procedures: Any portion of the completed pavement determined by the Engineer to be defective in surface texture, density or composition, or that does not comply with the requirements of the specifications shall be corrected at the expense of the Contractor. Any corrective courses placed as the final wearing surface shall not be less than one and one-half inches in depth after compaction.

3.7 DEFICIENT PAVEMENT

- A. If pavement placed by the Contractor does not meet the specifications, and the Engineer requires its replacement or correction, the Contractor shall:
 - 1. Propose a corrective procedure to the Engineer for review and approval prior to any corrective work commencing. The proposal shall include:
 - a. Limits of pavement to be replaced or corrected, indicating stationing or other landmarks that are readily distinguishable.
 - b. Schedule.
 - c. Construction method and sequence of operations.
 - d. Methods of maintenance and protection of traffic.
 - e. Material sources.
 - f. Names and telephone numbers of supervising personnel.
 - 2. Perform all corrective work in accordance with the Contract and the approved corrective procedure.

3.8 JOINTS AND CRACKS IN BITUMINOUS CONCRETE PAVEMENT

- A. Cracks.

1. Control of Joint Seal Material: Material that is heated or cooled beyond the manufacturer's specified temperature range shall be discarded.
2. Sawing and Sealing Joints in Bituminous Concrete Pavement: Work under this item shall consist of making a straight-line saw cut transversely across the final course of bituminous concrete pavement directly over the new and existing Portland Cement concrete (PCC) transverse joints. The sawing and sealing of joints shall be completed for bituminous concrete pavements with a total depth of three inches or greater. The saw cut shall be immediately sealed with a joint seal material. The sawing and sealing shall commence within one week of the completion of any final course of pavement and be a continuous operation until all joints have been completed. If the final course of pavement will not be completed prior to winter shutdown, each exposed course shall have a ¼ inch by ¼ inch kerf cut above the new and existing transverse joints. The kerf shall be cut with a saw or abrasive wheel approved by the Engineer. The kerf cut shall not be sealed. The kerf cuts at the joints will be paid under the contract item "Kerf Cut in Bituminous Concrete Pavement".
3. Prior to the paving operation, the Contractor shall establish sufficient controls to locate each transverse joint. This work shall include setting markers at each joint to reference its location and alignment, and having each of these markers tied and referenced. A written procedure for this work shall be submitted to the Engineer for review prior to commencement of such work.
4. The saw cut will be made by using diamond saw blades with a gang blade arrangement in order to achieve the joint detail as shown on the plans. The saw cut will be in a straight line across the pavement directly over the joint. Transverse joints shall extend to a point two feet beyond the underlying PCC pavement. The sawed joints shall be cleaned with compressed air to the satisfaction of the Engineer.
5. Immediately following the cleaning, the joint seal material shall be installed. When cooled, the top of the sealant material shall be recessed a minimum of 1/16 inch (1.6 millimeters) but not greater than 1/8 inch (3.2 millimeters) below the adjacent pavement surface. The roadway shall not be opened to traffic until the material has become tack free. Any depression in the sealer greater than 1/8 inch (3.2 millimeters) shall be brought up to the specified limit by further addition of joint seal material. Care shall be taken during the sealing operation to ensure that overfilling and spilling of material is avoided.
6. Any reflective cracking attributable to improper joint referencing or construction shall be repaired at the expense of the Contractor, in a manner approved by the Engineer for a period of one year from the date of completion of any sawed and sealed portion of final pavement.

3.9 CLEANING AND SEALING JOINTS AND CRACKS IN PAVEMENT

- A. Work under this item shall consist of cleaning existing joints and cracks of all dirt, dust, loose joint material, and all deleterious matter with compressed air to the satisfaction of the Engineer. After a sufficient number of joints and cracks have been cleaned so as to ensure a continuous operation, all joints and cracks shall be sealed with joint seal material.

3.10 CUT BITUMINOUS CONCRETE PAVEMENT

- A. Make a straight-line cut in the bituminous concrete pavement to the lines delineated on the Drawings or as directed by the Engineer. The cut shall provide a straight, clean, vertical face with no cracking, tearing or breakage along the cut edge.

3.11 BITUMINOUS CONCRETE SIDEWALKS

- A. Forms: Where walls, curbing or other suitable permanent supports are not present, satisfactory forms shall be installed to assist in securing alignment and adequate compaction of the base and surface courses. All forms shall be removed and backfilled with proper material.
- B. Placing Bituminous Concrete: The bituminous concrete walk surface shall be laid in a single course to a depth after compaction of 4 inches, unless otherwise detailed or directed.
- C. Unless otherwise directed, the walk shall have a minimum pitch of 3/16 of an inch per foot of width to provide for proper drainage.
 - 1. Spreading Mixture. The mixture shall be dumped, as needed, in wheelbarrows or an approved steel dump sheet outside the areas on which it is to be placed. It shall then be immediately distributed into place by means of shovels and raked into a uniformly loose layer to the full width required and of such depth that, when the Work is completed, it shall conform to the grade and surface contour required.
 - 2. Rolling. The surface shall be rolled with a self-propelled, tandem roller weighing not less than 1-1/2 tons and not more than 5 tons. In places inaccessible to a power roller, compaction shall be obtained by means of mechanical rammers or by hand tampers weighing not less than 50 pounds and having a tamping face not exceeding 100 square inches.
 - 3. Testing Surface. When tested with a 10-foot straightedge placed parallel to the centerline of the courses, there shall be no deviation from a true surface in excess of 1/4 of an inch.

3.12 FIELD QUALITY CONTROL

- A. Independent Testing Laboratory: Contractor shall retain a third-party testing entity to perform construction testing of in-place bituminous concrete courses for compliance with requirements for thickness and surface smoothness. Contractor shall pay all costs for testing.
- B. Bituminous surface and base courses shall be randomly cored at a minimum rate of one core for every 20,000 square feet of paving. However, no less than three cores in light duty areas and three cores in heavy duty areas shall be obtained. Coring holes shall be immediately filled with full-depth asphalt or with concrete. Bituminous concrete pavement samples shall be tested for conformance with the mix design.
- C. Grade Control: Establish and maintain required lines and elevations.
- D. Thickness: In-place compacted thickness shall not be less than the thickness specified on the drawings. Areas of deficient paving thickness shall receive a tack coat and a minimum 1" thickness, at the discretion of Engineer, until specified thickness of the course is met or exceeded at no additional expense to Owner.
- E. Surface Smoothness: Testing shall be performed on the finished surface of each bituminous concrete course for smoothness, using 10'-0" straightedge applied parallel with, and at right

angles to centerline of paved area. The results of these tests shall be made available to Engineer upon request. Surfaces will not be acceptable if exceeding following tolerances for smoothness:

1. Bituminous Concrete Class 4: tolerance +/- 3/4 inch
 2. Bituminous Concrete Class 1, 2 and 12: tolerance +/- 1/2 inch
- F. Check surfaces areas at intervals necessary to eliminate ponding areas. Remove and replace unacceptable paving as directed by Engineer.
- G. Compaction: Field density tests for in-place materials shall be performed by examination of field cores and shall have a minimum compacted density of 95% of laboratory Marshall Density in accordance with one of the following standards:
1. Bulk Specific Gravity and Density of Compacted Bituminous Mixture Using Paraffin-Coated Specimens: ASTM D1188.
 2. Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens: ASTM D2726.
 3. Rate of testing shall be one core per 20,000 square feet of pavement, with a minimum of 3 cores from heavy-duty areas and 3 cores from standard-duty areas. Cores shall be cut from areas representative of the project.
 4. Areas of insufficient compaction shall be delineated, removed, and replaced in compliance with the specifications at no expense to the Owner.

3.13 MEETING EXISTING PAVEMENTS

- A. Where new pavements are to meeting existing pavements, the Contractor shall saw cut the existing pavements so that there will be a vertical butting surface between the old and new pavements. Sawcutting of existing pavements shall be along neat, straight and even lines, and shall be done in such a manner so as not to damage the adjacent pavement which is to remain.
- B. Full-Depth Pavement - The existing pavement shall be sawcut by an approved method for the full depth of the pavement prior to placement of any new pavement. The existing bituminous surface shall be trimmed to a neat true line with straight vertical edges free from irregularities, and the trimmed edges shall be treated with a light coating of asphaltic emulsion immediately prior to the installation of the new abutting bituminous concrete surface course to provide a bond between the old and new pavement. The new compacted pavement surface shall be finished flush with the adjacent pavement.
- C. Bituminous Concrete Overlays: A line shall be cut by an approved method where the new pavement is to meet the existing pavement. The existing bituminous surface shall be trimmed to a neat true line with straight vertical edges free of irregularities for a minimum depth of one and one half inches. Sufficient pavement shall then be ground by machine method leaving a tapered Section of pavement ground one and one-half inches thick at the pavement butt and feathered back to meet the existing pavement surfaces. The ground, tapered transition section width shall be two feet at driveways and six feet in roadways and parking areas. Immediately prior to the placement of the bituminous concrete overlay the trimmed edges of the existing pavement shall be treated with a coating of asphaltic emulsion to bond the new pavement to the old pavement. The new pavement surface shall be finished

flush with the adjacent pavement. Surface seam of pavement joint shall be painted with emulsion and covered with sand or proper material to absorb excess emulsion.

END OF SECTION

SECTION 32 1623 - CURBING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Precast concrete curb.
 - 2. Cast-in-place concrete curb.
 - 3. Bituminous concrete "Cape Cod" curb.
- B. Work shall also include all associated items and operations necessary and required to complete the installations, including, but not limited to, surface preparation, finishing and cleanup.
- C. Contractor shall coordinate work between all Subcontractors, sections, and trades required for the proper completion of the work.

1.2 REFERENCES

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. United States Code of Federal Regulations (CFR)
 - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. State of Connecticut Department of Transportation (ConnDOT)
 - 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004.
- D. American Society for Testing and Materials (ASTM)
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
 - 3. ASTM C150 - Standard Specification for Portland Cement.
 - 4. ASTM D235 - Standard Specification for Mineral Spirits (Petroleum Spirits).
 - 5. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes
 - 6. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
 - 7. ASTM C309 - Standard Specification for Liquid Membrane - Forming Compounds for Curbing Concrete.
 - 8. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

9. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
 10. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 11. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
- E. American Concrete Institute (ACI)
1. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- F. American Association of State High and Transportation Officials (AASHTO)
1. AASHTO M 6 - Standard Specification for Fine Aggregate for Portland Cement Concrete.
 2. AASHTO M 85 - Standard Specification for Portland Cement (Chemical and Physical).
 3. AASHTO M 133 - Standard Specification for Preservatives and Pressure Treatment Processes for Timber.
 4. AASHTO M 213 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 5. AASHTO M 233 - Standard Specification for Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.
 6. AASHTO M 240 - Standard Specification for Blended Hydraulic Cement.
 7. AASHTO T11 - Standard Method of Test for Materials Finer Than 75-um (No. 200) Sieve in Mineral Aggregates by Washing.
 8. AASHTO T21 - Standard Method of Test for Organic Impurities in Fine Aggregate for Concrete.

1.3 SUBMITTALS

- A. Submit Shop Drawings, manufacturer's literature, material certificates or other data indicating compliance with these Specifications.
- B. Precast Curbing: Submit for approval, data indicating size, shape and dimensions, finish and setting method.
- C. Stone Curbing: Submit for approval, the name of the quarry and the type of curb which the Contractor proposes to use. Samples of curbing shall be submitted for approval only when requested by the Engineer. Such submission shall be made sufficiently in advance of ordering so that the Engineer may have an opportunity to judge the granite, both as to quality and appearance.

- D. Precast Curbing: Submit representative test specimens of the cured concrete used in precast units showing a compressive strength of 4,000 pounds prior to shipping any units.
- E. Submit testing data for concrete as required by Section 033200 - Site Cast-in-Place Concrete.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Stone and precast curb units shall be delivered to the job adequately protected from damage during transit.
- B. Curbing shall be protected against staining, chipping, and other damage. Cracked, badly chipped, or stained units will be rejected and shall not be employed in the Work.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE CURB

- A. Concrete for precast concrete curbing shall have a minimum compressive strength of 4,000 psi at 28 days, and shall contain 5 to 7 percent entrained air.
- B. Precast concrete curb shall be treated with a protective coating of Linseed Anti-Spalling Compound. Boiled linseed oil mixture shall conform to AASHTO M 233 and shall be composed of 50 percent (50 %) double boiled linseed oil and 50 percent (50%) petroleum spirits, ASTM D235, by volume.
- C. Finish and Color: Precast curb units shall be rub-finished in the following manner:
 - 1. After the concrete has properly hardened, the exposed surfaces shall be rubbed with a No. 16 carborundum stone or an abrasive of approved equal in a manner to fully remove cement enamel finish and expose a durable sand grain finish satisfactory to Engineer. No cement shall be used in the rubbing process.
 - 2. The finish of these units shall be uniform and shall conform to those of adjacent work in their final position.
- D. Precast concrete curb sections shall be furnished with sockets in each end to receive dowels to maintain the horizontal and vertical alignment of the curb. The dowel socket shall be 11/16 inch by 2-1/2 inches.
- E. Dowels: Steel, 5/8 inch by 4 inch with minimum yield strength of 36,000 psi. Dowels shall be supplied by the curb manufacturer.

2.2 CAST-IN-PLACE CONCRETE CURB

- A. Concrete and reinforcement for cast-in-place concrete curbs shall be as specified in **Section 03 3200 - Site-Cast-in-Place Concrete**.

2.3 BITUMINOUS CONCRETE "CAPE COD" CURBING

- A. Bituminous concrete for curbing shall be as specified in Section 321216 – Asphalt (Bituminous Concrete) Pavement.

2.4 CEMENT MORTAR

- A. Mortar shall be composed of one part Portland Cement, ASTM C150, and two parts, by volume, of surface dry fine aggregate. Hydrated lime, ASTM C207, in an amount not to exceed 4 pounds of lime to each bag of Portland Cement, may be added at the option of Engineer. Cement and hydrated lime shall conform to the following requirements:
1. Portland cement: Types I, II or IS.
 - a. Cement having a temperature exceeding 160°F (71°C) at the time of delivery to the mixer shall not be used in the concrete.
 - b. Types I, II, and III portland cement shall conform to the requirements of AASHTO M 85.
 - c. Type IS, Portland blast-furnace slag cement and Type IP, portland-pozzolan cement shall conform to the requirements of AASHTO M 240. The use of other approved cementitious material as a partial replacement for Type IS or Type IP cement will not be permitted.
 - d. Type I and Type III portland cement shall be used only when required or expressly permitted by Contract or Engineer.
 2. Hydrated lime: ASTM C 6.
 3. Fine aggregate: Fine aggregate shall be sand consisting of clean, hard, durable, uncoated particles of quartz or other rock, free from lumps of clay, soft or flaky material, loam, organic or other injurious material. In no case shall sand containing lumps of frozen material be used.
 - a. Fine aggregate shall contain not more than 3% of material finer than a No. 200 (75 µm) sieve, using AASHTO T 11.
 - b. Organic Impurities: Fine aggregate subjected to the colorimetric test shall not produce a color darker than Gardner Color Standard No. 11, using AASHTO T 21. If the fine aggregate fails to meet this requirement, the provisions of AASHTO M 6, Section 5.2, will govern.
 - c. Gradation: For laying stone or precast units, fine aggregate shall be uniformly graded from coarse to fine and shall meet the following gradation requirements:

Aggregate Gradation (Cement Mortar for Laying Stone or Precast Units)

Sieve	Percent Passing
3/8"	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60

No. 50	10-30
No. 100	2-10

- d. Gradation: For pointing stone or precast units, fine aggregate shall be uniformly graded from coarse to fine and shall meet the following gradation requirements:

Aggregate Gradation (Cement Mortar for Pointing Stone or Precast Units)

Sieve	Percent Passing
No. 8	100
No. 50	10-40
No. 100	0-10

4. Water: Potable quality.

2.5 JOINT FILLER

- A. Preformed expansion joint filler or wood joint filler as indicated on the plans.
- B. Preformed expansion joint filler shall be the bituminous cellular type and shall conform to the requirements of AASHTO M213.
- C. Boards for wood joint filler shall be planed on two sides and shall be either redwood, cypress or white pine. Redwood and cypress boards shall be of sound heartwood. White pine boards shall be of sound sapwood.
 1. Occasional small, sound knots and medium surface checks will be permitted provided the board is free of any defects that will impair its usefulness for the purpose intended. The joint filler may be composed of more than one length of board in the length of the joint, but no board of a length less than 6 feet may be used; and the separate boards shall be held securely to form a straight joint. Boards composed of pieces that are jointed and glued shall be considered as one board.
 2. Dimensions shall be as specified or shown on the plans; and tolerances of plus 1/16-inch thickness, plus 1/8-inch depth and plus 1/4-inch length will be permitted.
 3. All wood joint filler boards shall be given a preservative treatment by brushing with a creosote oil conforming to AASHTO M133. After treatment, the boards shall be stacked in piles, each layer separated from the next by spacers at least 1/4 inch thick; and the boards shall not be used until 24 hours after treatment.

2.6 TRANSITION SECTIONS

- A. Horizontal transition sections shall be provided at all locations where curb sections change (i.e., vertical to sloped). Vertical transition sections shall also be provided for precast curb sections at handicapped ramps to create a smooth transition with a doweled joint. Vertical transition sections for stone curb shall be made as shown on the Drawings.

PART 3 EXECUTION

3.1 GENERAL

- A. Trenching, excavation, backfilling, and compaction shall be completed in accordance with Section 31 2310 - Earthwork, except as modified within this Section.
- B. Cement Mortar Bedding, if required, shall be placed as indicated in details in accordance with Section 03 3200 - Site Cast-In Place Concrete.

3.2 PRECAST CONCRETE CURB

- A. Precast units delivered to the site shall be inspected for damage, unloaded and placed along excavated trench or other designated location with the minimum amount of handling.
 - 1. Materials shall be handled in such a manner as to insure delivery to trench in a sound and undamaged condition.
 - 2. All individual pieces of curbed curbing shall be marked to correspond to the radius and location where curbing is to be set.
- B. Excavation shall be made in accordance with details on the plans and shall extend 6 inches below and behind finished curb sections.
 - 1. Screened gravel base shall be compacted to a firm, even surface.
- C. Installation of precast concrete curb shall be completed within the prepared trench such that each section is doweled to the next continuously and conforming to the line, grade, and cross-section shown on the plans, unless otherwise directed by Engineer. Installation shall be completed in such a manner as to prevent damage to the precast units.
- D. After the curb is set, trench shall be backfilled immediately with approved material. The first layer to be 4 inches in depth, thoroughly rammed, the other layers to be not more than 6 inches in depth and thoroughly rammed until the trench is filled. Care is to be taken not to affect the line or grade of the curb during this procedure.
- E. All curb joints shall be filled with caulking compound (color-cement mortar grey). One joint every 50-feet shall be left clean of caulk to allow for expansion.

3.3 BITUMINOUS CONCRETE "CAPE COD" CURB

- A. General Requirements
 - 1. Bituminous curbing shall be constructed by the use of an approved self-propelled extruding curb machine equipped with a material hopper, distributing screw and curb forming device capable of placing the bituminous mixture to the required lines, grades and proper curb cross-section. Prior to the placement of any curb, Contractor shall submit a detail of the cross-section of the curb mold that he proposes to use to Engineer for approval.
- B. Surface Preparation
 - 1. When curbing is to be placed on existing bituminous pavements, concrete pavements or newly laid bituminous pavements which have been in place more than twenty-four

(24) hours, the surface on which the curb is to be placed shall be swept and cleaned, thoroughly dried, and immediately prior to placement of the curb, the surface to be occupied by the curb shall be given an application of tack coat material. Particular care shall be exercised to prevent spread of tack coat material beyond the area to be occupied by the curb. Recently placed bituminous concrete pavement, which have been placed less than twenty-four (24) hours prior to placement of the curb need only be thoroughly swept and cleaned.

C. Placing and Compaction

1. The hot bituminous mixture shall be placed in the hopper of the curb paver without segregation and extruded through the mold form to provide the proper compaction and surface texture.
2. The curb paver shall be properly supported and weighted during operation along the edge of the pavement and shall be guided along string or chalk lines to maintain the proper alignment and level of the completed curb.
3. Any portions of the completed curb, which are not satisfactorily compacted, or show signs of sagging, cracking, or distortion, or do not conform to the required lines, grades or cross-section for any reason, and which cannot be satisfactorily repaired during construction, shall be removed and replaced at no additional cost to the Owner.

D. Joints: Bituminous curb construction shall be a continuous operation in one direction only, to eliminate frequent joints. When the placing of the curb is discontinued for a length of time that permits the mixture to become chilled, the curb shall be cut in a true vertical plane and the exposed end painted with a thin uniform coat of hot asphalt cement just prior to placing the fresh curb mixture against the previously constructed curb to insure a continuous bond.

3.4 CONCRETE CURB (CAST-IN-PLACE)

- A. General Requirements: Concrete curb shall be constructed of concrete and shall be cast-in-place on the prepared subbase in accordance with the dimensions and details line and grade shown on the Drawings. Curbing shall be constructed using conventional forms and in segments separated by construction joints and expansion joints as specified herein. This item shall consist of concrete curbing constructed or as ordered and in conformity with these specifications.
- B. Forms: Forms shall be metal or acceptable planed and matched lumber, straight and free from warp or other irregularities that will adversely affect the installation. Forms shall conform to the curb cross-section shown on the Drawings and shall be carefully set to line and grade and thoroughly braced and secured in place so that there will be no displacement during placement of the concrete. All forms shall be thoroughly cleaned prior to reuse.
- C. Placing of Concrete: Prior to placement of the concrete, the subgrade shall be moistened and the contact surfaces of the forms shall be given a light coating of oil that will not discolor the concrete. Concrete shall then be placed in the form as near to its final position as practicable, struck off with a template, spaded to prevent “rock-pockets” or “honey combing” adjacent to the forms and finished to a smooth even surface. The concrete may be compacted by mechanical vibrators if approved by Engineer. Placing by slip form methods shall be approved by Engineer.

- D. Expansion Joints: Vertical expansion joints shall be located approximately every seventy-five (75) feet and shall be so arranged that they shall match expansion joints in any adjacent concrete pavements and sidewalks. Unless directed otherwise, expansion joints shall also be installed at the PC and PT of all radius curb. Expansion joints shall be constructed vertical, plumb, and at right angles to the face of the curb.
1. Prior to concreting, all exposed surfaces of the wood filler shall be given a light brush coating of form oil.
 2. They shall be one-half ($\frac{1}{2}$) inch in width and formed with premolded bituminous joint filler cut to conform to the cross-section of the curb/curb gutter.
- E. Construction Joints: Vertical construction joints shall be located approximately every fifteen (15) feet being equally spaced between expansion joints. The length of these curb/curb gutter segments may be varied slightly for closures but in no case shall they be less than eight (8) feet. Construction joints shall be vertical, plumb and at right angles to the face of the curb and shall be formed by approved method that will provide complete separation of the curb segments during the placing of the concrete. If curb is formed by slip form methods, the joints shall be sawed as soon as practicable after the concrete has set to preclude raveling during the sawing and before any shrinkage cracking occurs in the concrete.
- F. Finishing: Forms shall be left in place for twenty-four (24) hours or until the concrete has sufficiently hardened as determined by Engineer so that they can be removed without injury to the curb. Upon removal of the forms, the exposed faces of the curb/curb gutter shall be immediately rubbed to a uniform surface. Rubbing shall be performed by experienced and competent concrete finishers. No plastering will be permitted.

END OF SECTION 321623

SECTION 33 4000 - STORM DRAINAGE SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Installation of new storm drain pipe, manholes and catch basins.
 - 2. Connection of exterior building roof drains and perimeter drains.
 - 3. Installation of under-drain pipe.
- B. Contractor shall coordinate work between all Contractors, sections, and trades required for the proper completion of the work.
- C. Contractor is responsible for all health and safety.
- D. Contractor is solely responsible for obtaining permits or approvals which may be required to perform the work of this section, including all costs, fees and taxes required or levied. Notify and obtain such permits or approvals from all agencies having jurisdiction prior to starting work.

1.2 REFERENCE STANDARDS

- A. Reference herein to any technical society, organization, group or regulation are made in accordance with the following abbreviations and, unless otherwise noted or specified, all work under this Section shall conform to the latest edition as applicable.
- B. Code of Federal Regulations (CFR)
 - 1. 29 CFR 1926, Safety and Health Regulations for Construction.
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
 - 2. ASTM A48 - Standard Specification for Gray Iron Castings.
 - 3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - 5. ASTM A536 - Standard Specification for Ductile Iron Castings.
 - 6. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - 7. ASTM C12 - Standard Practice for Installing Vitrified Clay Pipe Lines.
 - 8. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.

9. ASTM C55 - Standard Specification for Concrete Building Brick.
10. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
11. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
12. ASTM C139 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
13. ASTM C150 - Standard Specification for Portland Cement.
14. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
15. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
16. ASTM C387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
17. ASTM C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
18. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
19. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
20. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
21. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
22. ASTM C507 - Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe.
23. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
24. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
25. ASTM C700 - Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
26. ASTM C877 - Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections.
27. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
28. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.

29. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
30. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.
31. ASTM C 1628 - Standard Specification for Joints for Concrete Gravity Flow Sewer Pipe, Using Rubber Gaskets.
32. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
33. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120.
34. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
35. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
36. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
37. ASTM D2412 - Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
38. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
39. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
40. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
41. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
42. ASTM D2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
43. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
44. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
45. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
46. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

47. ASTM D4396 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications.
 48. ASTM F402 - Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.
 49. ASTM F405 - Corrugated Polyethylene (PE) Tubing and Fittings.
 50. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 51. ASTM F656 - Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
 52. ASTM F679 - Standard Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
 53. ASTM F714 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
 54. ASTM F758 - Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage.
 55. ASTM F894 - Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe.
 56. ASTM F1803 - Standard Specification for Poly (Vinyl Chloride)(PVC) Closed Profile Gravity Pipe and Fittings Based on Controlled Inside Diameter.
 57. ASTM F2306 - Standard Specification for 12 to 60 inch [300 to 1500 mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.
 58. ASTM F2648 - Standard Specification for 2 to 60 inch [50 to 1500 mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications.
- D. American Concrete Pipe Association (ACPA).
1. ACPA 01-103 - Concrete Pipe and Box Culvert Installation (latest revision and applicable supplements thereto).
- E. American Association of State High and Transportation Officials (AASHTO).
1. AASHTO H20 - Standard Specifications for HS-20, Highway Loading.
 2. AASHTO M105 - Standard Specification for Gray Iron Castings.
 3. AASHTO M198 - Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets.
 4. AASHTO M252 - Standard Specification for Corrugated Polyethylene Drainage Pipe.
 5. AASHTO M294 - Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm Diameter.

- F. Corrugated Polyethylene Pipe Association (CPPA).
 - 1. Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings (latest revision and applicable supplements thereto).
- G. State of Connecticut Department of Transportation (ConnDOT)
 - 1. Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 and any supplements.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit shop drawings, descriptive literature, or both, showing pipe materials and appurtenances to be furnished. Shop Drawings shall be submitted to Engineer for approval prior to ordering materials.
 - 2. Shop drawings showing the configuration, dimensions, layout, and spacing of major and minor components such as pipe, joints, restraints, valves, and other proposed details of assembly. Show in large-scale details any unique assembly, and/or installation requirements.
- B. Copies of manufacturer-provided installation instructions, operation instructions, and maintenance material for all equipment furnished under this Section.
- C. Manufacturer's warranties and associated warranty registration data in Owner's name. Submit two (2) copies of each warranty to Engineer in the manufacture's/supplier's standard form or if there is no standard form available, in a form specified by Engineer.
- D. As-Built Drawings.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a timely manner.
- B. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
- C. Sample pipe for testing, when requested by Engineer, shall be furnished by Contractor in sufficient numbers. The Contractor and/or the pipe manufacturer shall make the facilities and services for making the load tests available.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage
 - 1. Manufacturer shall package the pipe and other drainage materials in a manner designed to deliver the pipe to the Project Site neatly, intact, and without physical damage. Transportation carrier shall use an appropriate method to ensure the pipe is properly supported, stacked, and restrained during transport. Inspect materials delivered to site for damage; store with minimum of handling.

2. Unloading of the pipe and other drainage materials should be controlled so as not to collide with the other pipe sections or fittings, and care should be taken to avoid chipping or spalling, especially to the spigots and bells. For manhole sections, cone sections, bases, fittings and other precast appurtenances, utilize lifting holes or lifting eyes provided.
3. In cold weather conditions, use caution to prevent impact damage. Handling methods considered acceptable for warm weather may be unacceptable during cold weather.
4. Storage:
 - a. Store materials on site in enclosures or under protective coverings. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
 - b. Pipe shall be stored on clean, level ground to prevent undue scratching or gouging.
 - c. Store solvents, solvent compounds, lubricants, elastomeric gaskets, and any similar materials under cover out of direct sunlight. Provide additional storage measures in accordance with the manufacturer's recommendations. Discard materials if storage period exceeds the recommended shelf life. Solvents in use shall be discarded when the recommended pot life is exceeded.
 - d. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.
 - e. Cement, Aggregate, and Reinforcement: As specified in Section 033200 – Site Cast-in-Place Concrete.
 - f. Store manhole units in an upright position.

PART 2 MATERIALS

2.1 GENERAL

- A. Products furnished under this Section which are damaged or found defective in any way prior to being set in place and final acceptance, may be rejected. Engineer may reject an entire lot of pipe should the sample pipe from such lot fail to meet requirements.

2.2 CONCRETE GRAVITY PIPE

- A. Pipe greater than 12 inches in diameter: Reinforced concrete pipe, ASTM C 76, Class 3.
- B. Class IV shall be required when cover is less than 12 inches.
- C. Pipe less than 12 inches in diameter: Concrete pipe, ASTM C 14, Class 3.
- D. Fittings and specials shall conform to the applicable requirements specified for the pipe.
- E. Gaskets and pipe ends for rubber gasket joint: ASTM C 443.

2.3 POLYVINYL CHLORIDE (PVC) GRAVITY PIPE

- A. Pipe, 4 inch to 15 inch diameter: ASTM D 3034, SDR-35. Elastomeric gasket joints, retained gaskets, part of a complete pipe section and supplied as such.
- B. Pipe, 18 inch to 36 inch diameter: ASTM F 679. Elastomeric gasket joints, retained gaskets, part of a complete pipe section and supplied as such.
- C. PVC Cell classification: 12454 or 12364, ASTM D1784.
- D. Pipe shall have a minimum pipe stiffness that equals or exceeds 46 psi (lbs / in- in).
- E. Pipe shall be marked along the outside of the barrel with the following:
 - 1. The manufacturer's name or trademark.
 - 2. The standard to which it conforms/ASTM Designation.
 - 3. Pipe size.
 - 4. Material designation code/PVC cell classification.
 - 5. SDR number or schedule number.
- F. Standard length of pipe: maximum of 20 feet with the following exceptions.
 - 1. Length of 6-inch pipe shall be a maximum of 13 feet unless otherwise approved by Engineer.
 - 2. Pipe used in house connections and/or laterals shall not exceed 6.5 feet in length unless otherwise approved by Engineer.
- G. PVC Plastic Gravity Joints and Jointing Material.
 - 1. Joints: ASTM D3213, gasketed, bell-and-spigot, push-on type.
 - 2. Gaskets: ASTM F 477. Since each pipe manufacturer has a different design for push-on joints, gaskets shall be part of a complete pipe section and provided as such. Gaskets may be factory installed or field installed as recommended by the pipe manufacturer. Lubricant shall be as recommended by the pipe manufacturer.
- H. Fittings: SDR-35, ASTM D 3034 and ASTM F1336, specifications as pipe.
- I. The manufacturer shall provide waterstops acceptable to Engineer, which shall be applied to the outside of the plastic pipe where the pipe is to be enclosed in any structure where concrete or mortar is used to prevent leakage along the outer wall of the barrel of the pipe.
- J. No single piece of pipe shall be laid on any project covered by these specifications unless it is found to be generally straight. Such pipe shall have a maximum ordinate as measured from the concave side of the pipe not to exceed 1/16 inch per foot of length. If the deviation from straightness exceeds this requirement, then the particular piece of pipe shall be rejected.

2.4 CORRUGATED POLYETHYLENE PIPE

- A. Pipe: High density polyethylene, corrugated, smooth interior, ASTM D3350, Cell Classification 424420C.
 - 1. Four (4) inch through 10 inch diameter pipe: AASHTO M252, Type S.
 - 2. 12 inch through 60 inch diameter pipe: AASHTO M294, Type S or ASTM F2306.
- B. Joints: Bell-and-spigot joint, AASHTO M252, AASHTO M294, or ASTM F2306. Bell shall be an integral part of the pipe and provide a minimum pull-apart strength of 400 pounds. Bell-and-spigot joint shall incorporate a gasket making it silt-tight. Gaskets shall be installed in the bell, or on the pipe by the pipe manufacturer.
 - 1. Four-inch (4") through 60-inch (60") diameter pipe shall be watertight, ASTM D3212. Gaskets: polyisoprene, ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly.
 - 2. 12-inch (12") through 60-inch (60") diameter pipe shall have a reinforced bell with a bell tolerance device. The bell tolerance device shall be installed by the manufacturer.
 - 3. Coupling bands shall conform to the manufacturer's specifications. Couplers shall cover not less than one corrugation on each section of pipe.
- C. Fittings: AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the watertight joint performance requirements of AASHTO M252, AASHTO M294 or ASTM F2306.
- D. Saddle Tee
 - 1. Saddle tees shall be manufactured saddle tees designed to connect to the corrugated polyethylene pipe.
 - 2. Fittings shall conform to AASHTO M 294. Fabricated fittings shall be welded on the interior and exterior of all junctions.
 - 3. A soil-tight seal shall be obtained with the coupling at the saddle tee stub to the storm service pipe.

2.5 UNDERDRAIN

- A. Pipe: 6-inch diameter Perforated Polyvinyl Chloride (PVC) Gravity Pipe or Corrugated Polyethylene Pipe.
 - 1. Perforated Polyvinyl Chloride (PVC) Gravity Pipe: ASTM F758.
 - a. Perforations shall be uniformly spaced along the length and circumference of the pipe.
 - b. Joints: Solvent weld with primer (ASTM F656) and solvent cement (ASTM F493) per ASTM D2855 or integrally-formed bell and spigot gasketed

connections with elastomeric seals (gaskets) meeting the requirements of ASTM F477.

2. Corrugated Polyethylene Pipe: AASHTO M252 Type SP (Double Wall).
 - a. Perforations: Class 2 slotted perforations per AASHTO M252. Perforations shall be uniformly spaced along the length and circumference of the pipe.
 - b. Joints: Joint: Silt-tight, ASTM D3212.

2.6 JOINT LUBRICANT

- A. As specified by pipe manufacturer, ANSI/AWWA C111/A21.11.

2.7 CATCH BASINS

- A. Reinforced precast concrete base, sump, transition, riser, corbel, and top: ASTM C913 for precast rectangular catch basins, ASTM C478 for precast circular catch basins. Type and dimensions as indicated on the Drawings.
 1. Concrete: 4,000 psi minimum, 4% - 7% entrained air.
 2. Reinforcement: ASTM C890. Steel bars, ASTM A615. Welded-wire fabric, ASTM A185. Additional reinforcing at openings.
 3. Precast sections shall consist of smooth sections in standard nominal inside diameters. All precast concrete sections shall be free from cracks, damaged joints, exposed reinforcing, aggregate pockets, spalls, and dimensional distortions or other irregularities. Lifting holes shall be filled with mortar, or other approved material.
 4. Openings or "knockouts" in precast units shall be located as shown on the Drawings and to accommodate the inflow and outflow pipe orientation required. Openings shall sized sufficiently to permit passage of the largest outside dimension of pipe or fittings. Prior to ordering precast manhole bases, all angles between incoming pipes are to be field checked to incorporate possible line changes required in the field layout.
 5. External damp-proofing: Asphalt, ASTM D449, Type A.
- B. Gaskets for joints between sections: Butyl rubber, ASTM C 443.
- C. Grade Rings: ASTM C 478, precast reinforced concrete, 1 inch to 4 inch thickness, dimensions to match basin and top section.
- D. Catch basin hood
 1. Cast Iron
- E. Frame and Grate.
 1. Cast iron: AASHTO M 105, Class 25 for frames and Class 30 for grates.
 2. Cast steel: ASTM A 27, Grade optional, thoroughly annealed.

3. Structural Steel: ASTM A 36, or A 283, Grade B or better, as to quality and details of fabrication, except that in the chemical composition of the steel, the 2/10 of 1% of copper may be omitted.
4. Grate type: ConnDOT "Type A" as indicated on the Drawings.
5. Covers and gratings shall bear uniformly on their supports.
6. Frame and grate shall be painted or galvanized, ConnDOT Form 816 M.06.03. Cast Iron frames and grates shall not be galvanized.

2.8 CONCRETE MANHOLE

- A. Precast concrete manhole risers, base sections, and tops: ASTM C 478. Precast manhole sections shall consist of smooth circular sections in standard nominal inside diameters. All precast concrete manhole sections shall be free from cracks, damaged joints, exposed reinforcing, aggregate pockets, spalls, and dimensional distortions or other irregularities. Lifting holes, when provided, shall be filled with mortar, or other approved material.
 1. Concrete: 4,000 psi minimum, 4% - 7% entrained air.
 2. Diameter: 48-inches unless otherwise indicated.
 3. Base and first riser: Monolithic and built to the dimensions and requirements indicated on the Drawings.
 - a. Bottoms shall be integrally cast unless specialty bases ("Dog-House") at points of connection to existing piping is indicated on the Drawings or otherwise proposed for use. Unless indicated on the Drawings, any special bases or riser used must be detailed in shop drawings and submitted for approval.
 4. Riser sections: As required to provide depths indicated.
 5. Top Section: Concentric-cone type, unless eccentric-cone or flat-slab-top type is indicated. Cones shall have the same wall thickness and reinforcement as riser sections. If required or called-for, flat slab shall be a minimum of 8-inches thick designed to carry AASHTO H-20 loading with one foot cover and conform to ASTM C478.
 6. External damp-proofing: Asphalt, ASTM D449, Type A.
 7. Openings or "knockouts" in precast units shall be located as shown on the Drawings and to accommodate the inflow and outflow pipe orientation required. Openings shall sized sufficiently to permit passage of the largest outside dimension of pipe or fittings. Prior to ordering precast manhole bases, all angles between incoming pipes are to be field checked to incorporate possible line changes required in the field layout.
- B. Gaskets for joints between manhole sections: Butyl rubber, ASTM C 443.
- C. Grade Rings: ASTM C 478, precast reinforced concrete, 1 inch to 4 inch thickness, diameter to match manhole and frame.
- D. Mortar: Packaged, ASTM C 387 or as Specified in Section 033200 – Site Cast-in-Place Concrete.

- E. Frame and Cover: Ductile Cast Iron, ASTM A536, Grade 60-40-18.]
- F. Frame and Cover: Grey Cast Iron, ASTM A48, Class 25B (Frame) and Class 30B (Covers), uncoated.
 - 1. Cover: 26 inch diameter, non-vented with non-penetrating pickholes. Unless otherwise detailed or indicated, covers shall be cast with 1-1/2 inch wide, raised letters, indicating "STORM SEWER" unless other lettering is called-for.
 - 2. Frame and cover shall be supplied as a pair from the same manufacturer. Castings shall be of tough, even-grained iron, free from scale, lumps, blisters, sand-holes and other injurious defects, and of the size and type shown on the drawings. Frames and covers shall have machined bearing surfaces to seat firmly and prevent rocking and rattling under traffic loads. Before leaving the foundry, castings shall be thoroughly cleaned, subjected to hammer tests for soundness and given two coats of coal tar pitch varnish.
- G. Resilient connectors for joints between manhole and pipes entering manhole: Continuous boot of 3/8 inch minimum thickness neoprene, ASTM C 923 or ASTM C 990. Boots shall be either cast into the manhole wall or installed into a cored opening using internal compression rings. Installed boot shall result in a water-tight connection meeting the performance requirements of ASTM C 443.
- H. Manhole Steps: ASTM C 478 and OSHA 29 CFR 1910.27, drop front or equivalent. Steps shall be nine inches in depth and at least twelve inches in width with an abrasive step surface.
 - 1. Composite Plastic-Steel: One-half (1/2) inch deformed steel reinforcing rod, ASTM A615, Grade 60, encapsulated in a co-polymer polypropylene plastic, ASTM D2146, Type II, Grade 16906.
 - 2. Steps shall be placed in vertical alignment as indicated on the Drawings. Steps shall be uniformly spaced not more than sixteen inches (16") on center, including the spacing between the top step and the manhole cover. Steps shall be embedded in the wall a minimum distance of 4 inches in either cast or drilled holes. Steps shall not be driven or vibrated into fresh concrete and shall withstand a pullout resistance of 2000 lbs when tested in accordance with ASTM C 497. Each step shall project a minimum of 5 inches from the wall measured from the point of embedment.

2.9 DROP MANHOLE

- A. Drop inlet shall be constructed with ductile iron gravity pipe laid in undisturbed soil in conformance with ASTM A746-82. Adapt to PVC with Fernco coupling or approved equivalent.
- B. Vertical drop pipe shall be 8", 10", or 12" maximum SDR 35 PVC with 90 degree short bend radius shall conform to ASTM D3034.
- C. Vertical drop pipe shall be anchored a minimum of every 4 feet with 1/8" x 1-1/2" type 304 stainless steel pipe straps set as ordered with lag bolts and shields.

2.10 MASONRY UNITS

- A. Brick: ASTM C32 Grade MS or ASTM C62 Grade SW.
- B. Concrete block: Solid block, ASTM C139.

MORTAR

- C. Mortar: ASTM C 387.
 - 1. Portland Cement: ASTM C 150, Type I.
 - 2. Sand: ASTM C 144.
 - 3. Hydrated Lime: ASTM C 207.
 - 4. Water: Potable.
 - 5. Mix proportions for manhole rims and covers: 1 part portland cement, 2 parts sand, and 1/4 part hydrated lime by dry volume. Hydrated lime shall not exceed 10 percent by weight of the total dry mix. Quantity of water in mixture shall be sufficient to produce a stiff, workable mortar, but in no case shall exceed 5-1/2 gallons of water per sack of cement.
 - 6. Mix Proportions for invert construction: 1 part portland cement and 2 parts sand by volume. Quantity of water in mixture shall be sufficient to produce a stiff, workable mortar, but in no case shall exceed 5-1/2 gallons of water per sack of cement.

2.11 BEDDING

- A. Bedding for pipes: Unless otherwise directed by Engineer, bedding shall consist of screened gravel, maximum size 3/4 inches and minimum size 3/8 inches.
- B. Bedding for Catch Basins: Screened Gravel or Crushed Stone, well graded in size from 3/4 inch to 3/8 inch consisting of clean, hard, and durable fragments. No limestone shall be permitted.

PART 3 EXECUTION

3.1 PIPE INSTALLATION

- A. As soon as the excavation is completed to the normal grade of the bottom of the trench, the Contractor shall immediately place the bedding material in the trench. Then the pipe shall be firmly bedded in the compacted bedding material to conform accurately to the lines and grade indicated on the Drawings.
- B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions.
- C. Notch under pipe bells and joints, where applicable to provide for uniform bearing under entire length of pipe.
- D. Excavation, backfilling and compaction shall be as specified in Section 312310 - Earthwork of these Specifications.

- E. Maintain optimum moisture content of bedding material to attain required compaction density.

3.2 MANHOLES AND CATCH BASINS

- A. Manholes and Catch Basins shall be constructed at the locations and to the lines, grades and dimensions noted on the Drawings, or as required.
- B. Precast concrete construction shall be done in a manner to insure watertight construction and all leaks in precast concrete shall be sealed. If required, precast concrete shall be repaired or replaced to obtain watertight construction.
- C. Concrete barrels and cones shall be precast concrete sections.
 - 1. Bases shall be either precast with a barrel integrally cast with the base, or poured concrete suitably shaped by means of accurate bell-rung forms to receive the barrel sections. Manhole invert channels in manholes shall be formed in concrete.
 - 2. Precast manholes shall have an adjustment ring at the top of the cone to permit the frame and cover to meet the finished surface. This shall consist of courses of brick or reinforced grading rings not to exceed 11 inches.
- D. Stubs shall be short pieces cut from the bell ends of the appropriate size and class of pipe. Concrete stubs shall be plugged with brick masonry unless otherwise directed.
- E. Manhole inverts - shall conform accurately to the size of the adjoining pipes.
 - 1. Manhole inverts shall be constructed of concrete developing 4,000 psi with the concrete being placed to the spring line of the pipe form.
 - 2. Smooth plastic pipe, matching the dimension of the outlet pipe, shall be used to form the invert.
 - 3. Side inverts and main inverts, where the direction changes, shall be laid out in smooth curves of the longest possible radius, which is tangent, within the manhole, to the centerline of adjoining pipelines.
 - 4. Invert shelves shall be graded to provide a 1-inch per 1-foot wash from the manhole walls.
- F. Manhole sections shall contain manhole steps accurately positioned and embedded in the concrete when the section is cast. Precast-reinforced concrete manhole sections shall be set so as to be vertical and with sections and steps in true alignment.
- G. All holes in sections used for their handling shall be thoroughly plugged with rubber plugs, made specifically for this purpose, or with mortar. The mortar shall be one part cement to 1-1/2 parts sand, mixed slightly damp to the touch (just short of "balling"), hammered into the holes until it is dense and an excess of paste appears on the surface, and then finished smooth and flush with the adjoining surfaces.

- H. The Contractor may, as an alternate to suitable nonshrink mortar joints, use premolded elastomeric-sealed joints for pipe into precast manhole bases.
 - 1. All materials, accessories and construction methods used in making the joints shall be supplied or approved by the manufacturer of the premolded elastomeric-sealed joint.
- I. Openings for pipe and materials to be embedded in the walls of the base for these joints shall be cast in the base at the required locations during the manufacture of the base. Incorrectly cast and patched pipe openings will be rejected.
- J. Manhole risers and tops shall be installed using approved “o-ring” type, neoprene gaskets for sealing joints. Units shall be installed level and plumb. Water shall not be permitted to rise over newly made joints nor until after inspection as to their acceptability. All jointing shall be done in a manner to insure water tightness.
- K. Openings shall be provided in the risers to receive entering pipes. These openings may be made at the place of manufacture. The openings shall be sized to provide a uniform 1 inch maximum annular space between the outside of the pipe wall and the opening in the riser. After the pipe is in position, the annular space shall be solidly filled with nonshrink mortar. Care shall be taken to assure that the openings are located to permit setting of the entering pipe at its correct elevation as indicated.
- L. Openings, which are cut in the risers in the field, shall be carefully made by coring so as not to damage the riser. Damaged risers will be rejected and shall be replaced at no additional expense to the Owner.
- M. Where required by the Drawings, a slot and opening shall be cast in the catch basin wall suitable for mounting the cast iron hood and discharge pipe. The hood hinge may be furnished to the precast supplier by the Contractor for incorporation into the casting during manufacture.

3.3 BRICK MASONRY

- A. Brick Masonry Construction shall be done in a manner to insure watertight construction and all leaks in brick masonry shall be sealed. All workmanship shall conform to the best standard practice and all brick masonry shall be laid by skilled workmen.
- B. All beds on which masonry is to be laid shall be cleaned and wetted properly. Brick shall be wetted as required and shall be damp but free of any surface water when placed in the Work. Bed joints shall be formed of a thick layer of mortar, which shall be smoothed or furrowed slightly. Head joints shall be formed by applying to the brick to be laid a full coat of mortar on the entire end, or on the entire side as the case requires, and then shoving the mortar covered end or side of the brick tightly against the bricks laid previously. The practice of buttering at the corners of the brick and then throwing the mortar or crappings in the empty joints will not be permitted. Dry or butt joints will not be permitted. Joints shall be uniform in thickness and shall be approximately 1-1/4 inch thick.
- C. Brickwork shall be constructed accurately to dimensions and brickwork at top of manholes shall be to the dimensions of the flanges of the cast-iron frames.

- D. Joints on the inside face of walls shall be tooled slightly concave with an approved jointer when the mortar is thumbprint hard. The mortar shall be compressed with complete contact along the edges to seal the surface of the joints.
- E. All castings to be embedded in the brickwork shall be accurately set and built-in as the Work progresses. Cast-iron frames and manhole covers shall be well bedded in mortar and accurately set to finished graded indicated or as directed.
- F. Water shall not be allowed to flow against brickwork or to rise on the masonry for 60 hours after it has been laid, and any brick masonry damaged in this manner shall be replaced as directed at no additional expense to the Owner. Adequate precautions shall be taken in freezing weather to protect the masonry from damage by frost.

3.4 CONCRETE MASONRY UNITS

- A. Concrete Masonry unit construction shall be soaked in water before laying. As circular concrete block walls are laid-up, the horizontal joints and keyways shall be flushed full with mortar. As rectangular blocks are laid-up, all horizontal and vertical joints shall be flushed full with mortar. Plastering of the outside of block structures will not be required. The joints in precast units shall be wetted and completely mortared immediately prior to setting a section. No structure shall be backfilled until all mortar has completely set.

3.5 MANHOLE STEPS

- A. Placement of steps into the precast walls shall be by a proven method as recommended by the supplier of the precast manhole sections. Details of the steps and method of placement shall be submitted for approval.
- B. Plastic steps shall be placed into the wet concrete wall during manufacture or if designed for press fit installation shall be driven into a wall opening according to the manufacturer's specifications. Steps shall not be mortared into place after the concrete has set.
- C. All manholes, catch basins, lawn inlets, etc., which are in excess of five feet in depth, shall be constructed with standard aluminum steps, spaced at 12-inch on center.

3.6 DROP INLETS

- A. Drop inlets shall be constructed to the lines, grades, dimensions and design at the locations indicated on the plans or as required.
- B. Construction shall conform to requirements outlined in Section 033013 - Site Cast-in-Place Concrete.
- C. Engineer may permit brick or concrete masonry construction. If this alternate is being employed, construction shall be done in accordance with paragraphs 3.04 or 3.05 in this Section.

3.7 CASTINGS

- A. Cast-iron frames for grates and covers shall be well bedded in cement mortar and accurately set to the grades indicated or as directed. The frames shall be encased with a thick cement-mortar collar around the entire perimeter of the frames.
- B. All voids between the bottom flange shall be completely filled to make a watertight fit. A ring of mortar, at least one-inch thick and pitched to shed water away from the frame shall be placed over and around the outside of the bottom flange. The mortar shall extend to the outer edge of the masonry all around its circumference and shall be finished smooth. No visible leakage will be permitted.
- C. Structures within the limits of bituminous concrete pavement shall be temporarily set at the elevation of the bottom of the binder course or as ordered. After the binder course has been compacted, these structures shall be set at their final grade. Backfill necessary around such structures after the binder course has been completed shall be made with Class A concrete unless otherwise ordered.

3.8 CLEANING

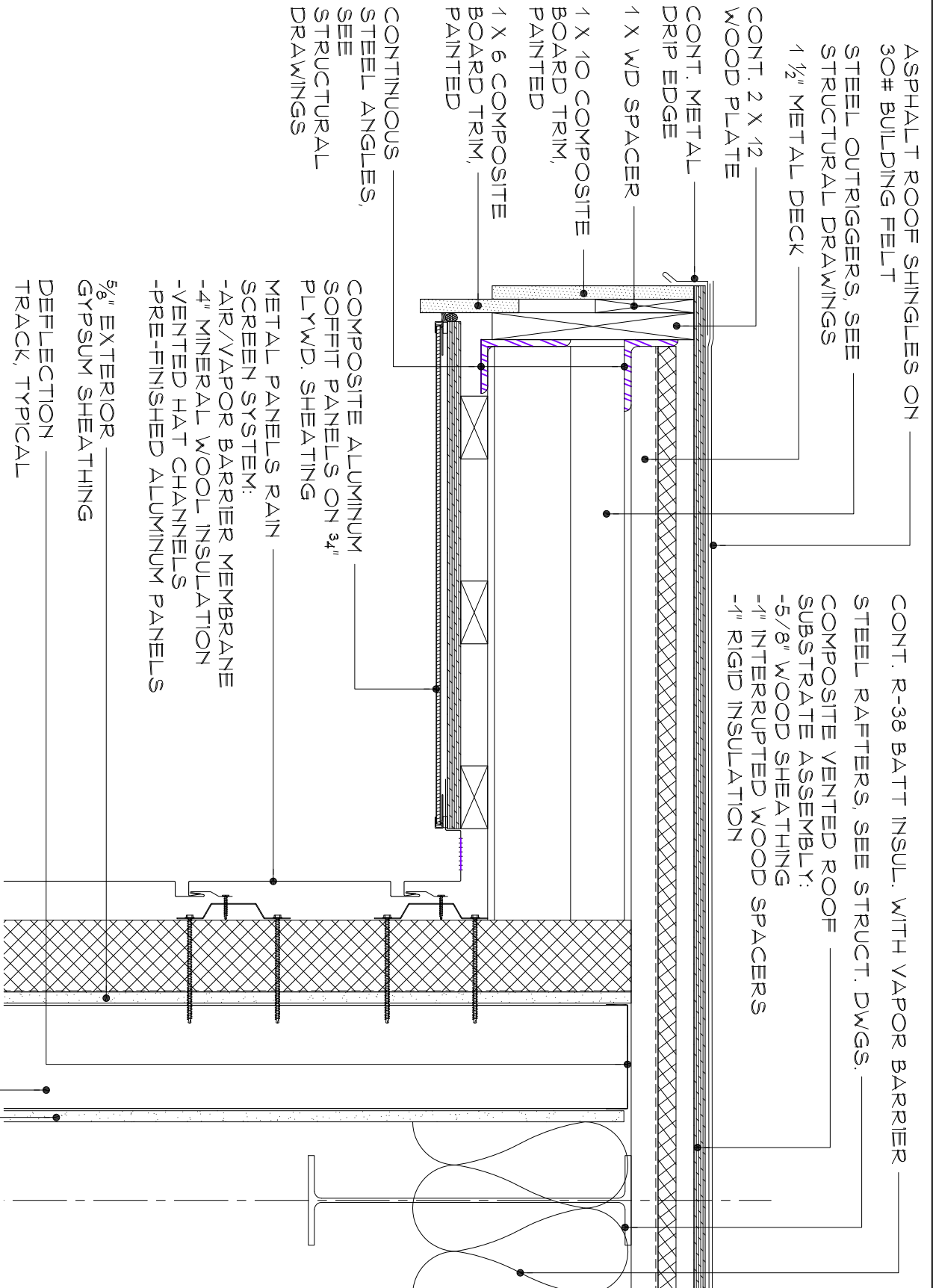
- A. At the completion of the Work, clean all piping, structures and open drainage courses, through and to which water from this construction is directed, to the satisfaction of Engineer.

3.9 AS-BUILT DRAWINGS

- A. Contractor shall be solely responsible for complying with the requirements of local permitting authorities for preparation and submittal of as-built drawings. The requirements for the preparation of as-built drawings as defined herein shall be considered the minimum requirements of Engineer, but shall in no way relive Contractor from satisfying the requirements of local permitting authorities.
- B. As work progresses, record the following on two (2) sets of Drawings:
 - 1. All changes and deviations from the design in location, grade, size, material, or other feature as appropriate.
 - 2. Any uncharted locations of utilities or other subsurface feature encountered during installation, including the characteristics of such uncharted utility or subsurface feature such as utility type, size, depth, material of construction, etc.
- C. Recording of changes shall be clearly and neatly marked in red pen or pencil. All changes shall be noted on the appropriate Drawing sheets.
- D. Make measurements from fixed, permanent points on the Project Site to accurately locate the work completed. Such measurements shall consist of at least three (3) ties showing the distance of each item relative to each of the fixed, permanent points.

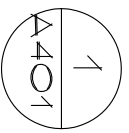
- E. As-Built Drawings shall be complete and shall indicate the true measurement and location, horizontal and vertical, of all new construction. As-Built drawings shall also contain any additional information required by Engineer.

END OF SECTION



ROOF DETAIL

SCALE: 1/2" = 1'-0"



5/8" G.W.B. PAINTED

Project Title:

Expansion & Renovate as New
Crystal Lake Elementary School
284 Sandy Beach Road
Ellington, Connecticut 06029



SILVER/PETRUCELLI + ASSOCIATES

Architects / Engineers / Interior Designers
3190 Whitney Avenue, Hamden, CT 06518-2340
Tel. 203 230 9007 Fax. 203 230 8247
silverpetrucci.com

Drawing Title:

Roof Detail

Date:

1/6/2014

Scale:

AS NOTED

Drawn By:

PEJ

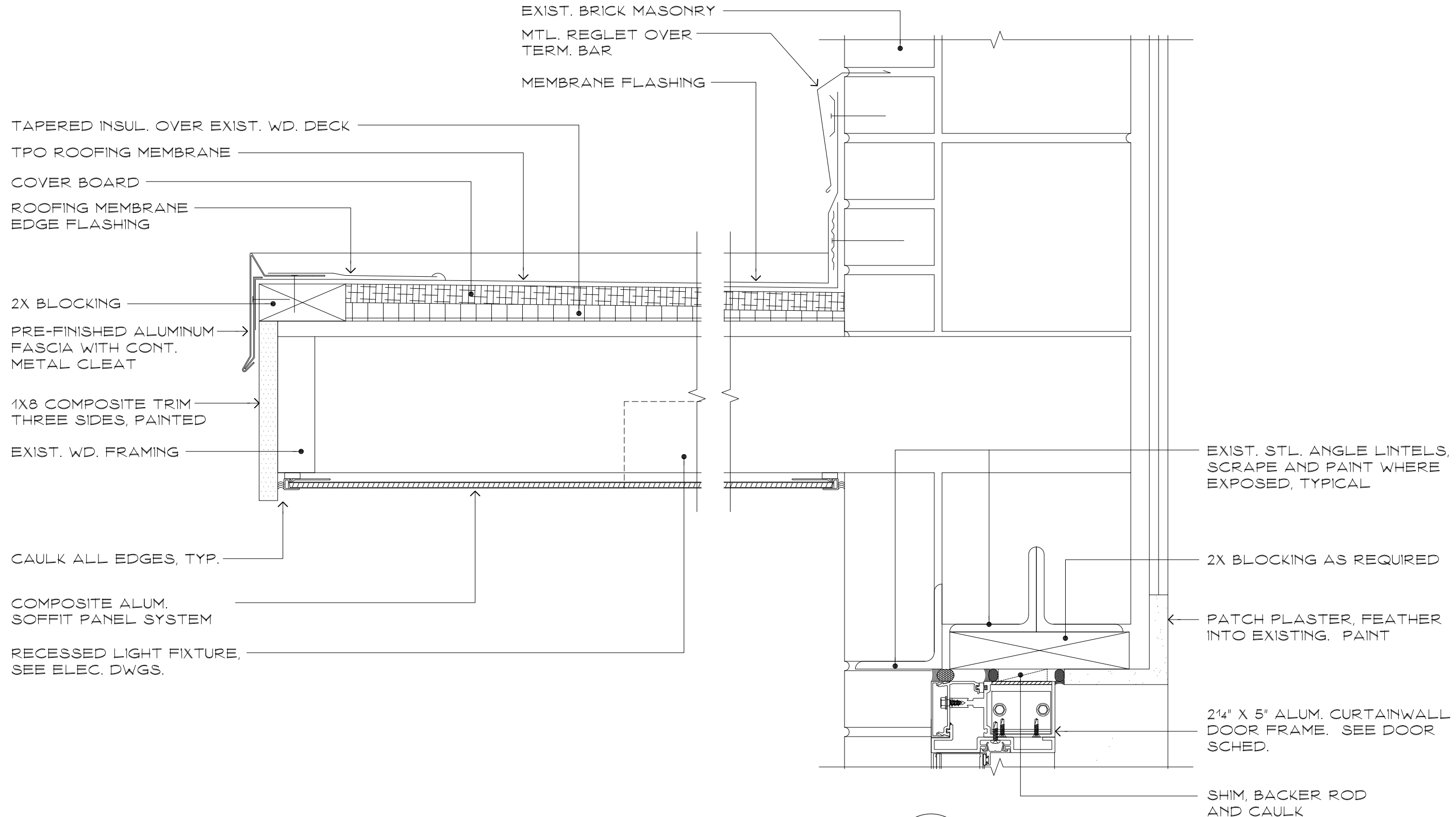
Project Number:

12.140

Drawing Number:

BID PHASE

SKA4



DETAIL @ WALL/ROOF, AREA "A"

SCALE: 3"= 1'-0"

E
A553

Drawing Number: BID PHASE	Date: 1/6/2014 Scale: AS NOTED Drawn By: PEJ Project Number: 12,140		
	Drawing Title: Roof/Wall Detail Area "A"		
Project Title: Expansion & Renovate as New Crystal Lake Elementary School 284 Sandy Beach Road Ellington, Connecticut 06029			
Architect: SILVER/PETRUCELLI + ASSOCIATES <small>Architects / Engineers / Interior Designers</small> 3190 Whitney Avenue, Hamden, CT 06518-2340 Tel. 203 230 9807 Fax. 203 230 8347 silverpetrucelli.com			